Moving Toward Sustainability Webinar Series

Webinar 2: Operational Resiliency

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Speakers:

- **Andrew Sawyers**, Director, U.S. EPA, Office of Wastewater Management
- **Jim Horne**, U.S. EPA, Office of Wastewater Management
- **Kathryn Sorensen**, Phoenix Water
- **Daryl Slusher**, Austin Water

Transcript:

Slide: Opening Remarks

Andrew Sawyers:
[Audio starts a few seconds into the presentation.] This is an area that we spent a lot of time, within the Office of Wastewater Management, thinking about, and it's an area that I support -- fully support. And so it's really good that we're having this conversation today in the hopes of furthering our discussion, if you will, and our enhancement around sustainable utilities. It's really important, again, as I said, to the Office of Wastewater Management, and especially working with utilities of all size from all sustainability and resilient practices. And I'll emphasize resilient because we have seen so many things happening recently, frankly, when you think about an all hazards approach and how we need to make our systems more resilient. So this is incredibly timely for us, and the idea of also pulling in or integrating sustainable financing approach is also a big factor here for us. In the Office of Wastewater Management, we're standing up a few new types of finance and opportunities, and so, as I said to Jim earlier this morning, we need to figure out how to integrate financing in our deliberations and conversations across the country as we work with the different sizes and the different types of utilities. These sustainable principles and practices, I think, hopefully will allow you and provide a broad range of environmental and economic benefits to the communities they serve. Again, we think it's really important that we can sort of broaden who the recipients are, and hopefully we can see benefits accruing to all the different [inaudible].

This is the second in a series of webinars put together by Jim and other members of our sustainability team here at EPA in my office. And the webinars are also being co-sponsored by WEF, AWWA, AMWA, and NACWA. The starting point for these webinars is our recent release of Sustainable Practices for Water and Wastewater Utilities, and Jim Horne will speak a little bit about that in a few minutes. The speakers today will talk about their efforts to become more resilient in the face of persistent drought, which affects their ability to meet long-term needs of their communities. And again, as we said, while drought might be the focus here, the hazards that face many of our communities are pretty significant. So we will continue to focus on all the hazards and ways to potentially mitigate some of those in terms of making our systems more resilient. The experience almost reminds us, again, that a sustainable utility must be resilient in the face of many of the difficult issues that we're wrestling with, whether it's drought, flooding, frankly, you know, some of the others.

And finally, I'd like to say a few words about an initiative that we're launching here to promote financial sustainability. Last month, I actually attended a meeting with the Vice President – actually an announcement with the Vice President, the Administrator of EPA, to launch the Water Infrastructure Financing Resiliency Center. And the idea here is to help communities across the country to improve their water and wastewater capacity, to help address their water, wastewater, stormwater obligations through financing, innovative financing, and building sort of resilience in their communities. The EPA will create this resource center. In many ways, we'll be operating like an advisory, if you will, but we will be doing this not just here at EPA but through our partnerships and our partners, USDA and others, helping to get communities to start thinking about how best to address their water, stormwater, and drinking water obligations. The center was actually, as I said, announced by the Administrator, along with the Vice President of the United States, and it was it was on the Anacostia, and it was an incredibly cold day. But I think the discussion and the announcement was incredibly positive and well received. And we're in the throes – we're starting to think about how to better build. We're building that work plan and starting to think about specific activities that we're going to be engaging in. We have a good idea what are some of the things we're going to work on. The challenge that I posed to our folks is let's start to think about, as we have these conversations about utility roadmaps, how do we help utilities to, you know, consider, frankly, what opportunities are available to provide innovative financing to address, you know, some of the concerns they are faced, whether it's resiliency issues or some of the immediate needs that wastewater facilities and drinking water and stormwater systems are facing. It's part of the – the center is part of the President's Build American Investment initiative, and, frankly, that's a government-wide initiative to increase infrastructure investment and promote economic growth by creating opportunities for state, local government, private sector in efforts to perhaps collaborate, expand public-private partnerships, and use -- sort of leverage the federal programs, frankly. I think so many activities we fund, actually we need to better figure out ways to integrate all the different federal entities in providing financing opportunities.

Let me just quickly tell you some of the core areas the finance center will focus on. One, that we will explore innovative financial tools, public-private partnerships as appropriate, non-traditional financing concepts that will leverage, again, the federal funds. And it will also build – not also. This will be a core part of this. It will build on the highly successful state revolving loan funds and other programs of EPA and its federal partners. And let me just digress a bit and talk about the state revolving loan funds. Both the drinking water and clean water have provided close to $133 billion worth of investment since their inception. And we see this center helping to enhance that and build upon the success that the state revolving loan funds have achieved and, as I said, you know, funded perhaps close to 46,000 projects since their inception. And that is pretty significant. And a significant amount of those have gone to small and medium-sized communities – the resources have gone to small and medium-sized communities. So we're extremely appreciative, and, frankly, whenever we do talk about the SRFs, we're excited about the achievement. Additionally, beyond what I just talked about in terms of what the center will do, we will explore ways to increase financing and certainly the resiliency effort that integrate water efficiency, energy efficiency, water reuse, and green infrastructure. These are going to be some core areas that the center will be working on. We will be looking at helping communities, selected communities, to help develop sustainable sources of funding, particularly around stormwater, but there are some other areas that we will be looking at. We'll build upon the existing work with the USDA around small systems through collaboration. We will coordinate very closely – EPA has – EPA is supporting several finance centers that are actually regionally located across the country. We will be supporting those finance centers, and

we'll consult with the agency Environmental Finance Advisory Board as we – as we provide services related to the water resource center. And we're currently in the process of building our staff. The center is, frankly, up and running, and so we're building the infrastructure needed, including staff, to move ahead.

So I just wanted to, I think, highlight that work because I think it's going to be very important to some of the efforts that Jim and others will discuss and describe going ahead. And again, I want to thank you all for participating today. I look forward to working with you. I personally look forward to working with you to make our systems and utilities more sustainable and more resilient. And so, Jim, I'd like to turn this back over to you, but thanks again to all for joining, and thanks for hearing my opening remarks.

Slide: From Aspirational to Operational

Jim Horne:
Thank you, Andrew. We really appreciate that support, and we will press on here, and I'll keep you posted on today's webinar. But thanks again. Okay. Thank you, everybody. I'm going to shortly bring up my slides here, and I'll make my presentation before we turn it over to Kathryn Sorensen and then Daryl Slusher. If you can bear with me here while the slides come up. Morgan?

Morgan Hoenig:
Yep, Jim, we can see your screen, so just go ahead and open PowerPoint.

Jim Horne:
Okay. I just hit show my – I'm sorry, everyone. Bear with us here.

Morgan Hoenig:
Jim, we can see your screen, so just go down to the bottom and open PowerPoint.

Jim Horne:
Okay. There we go. Okay, everyone. Thanks very much for bearing with us there as I brought up my slides. So again, my name is Jim Horne. I'm with the US EPA Office of Wastewater Management. I'll give our first presentation today. What I'd like to do is give a brief overview of what Andrew described as our Sustainable and Effective Practices Roadmap document, which we put out and finalized several months ago and is now being used by a group of utilities around the country. The roadmap document, as I'll refer to it as, is really kind of the basis for these webinars. But most importantly, both Kathryn and Daryl will focus on practices that they are implementing at their utilities to deal with resiliency, especially as it relates to floods. So as you can see from the title of the first slide, I call this "From Aspirational to Operational." We've done a lot of work over the last several years at EPA to work with utilities and national associations to identify sort of goals, which we describe as attributes, of utilities that want to become effective and ultimately fully sustainable. The document that I'm going to be describing allows you to take those aspirations and use sort of best practices to put that down to the operational level.

Slide: Available Online

So you can see that the document is available online at our website, and I would really encourage people to take a look at it. And more importantly -- and I'll say this again before I finish up here -- start to use the document. We took a long time putting it together with a lot of

assistance from water and wastewater professionals like you around the country. So we think it's an easy document to use, and we really encourage you to begin to do that. But here's where you can get the copy online.

Slide: Context

So the context of this work, the roadmap document that I'm referring to, and also the webinars and other work that we'll be doing, really is rooted in a lot of things. As we all know, utility efforts toward what I call sustainable operations are really all over the map around the country. Some utilities still struggle to consistently remain in compliance and provide, you know, the most basic services. Others are really moving ahead pretty aggressively to optimize their current services. And when I think of the term optimize, I mean sort of driving out the last molecule of inefficiency, if you will, but still providing kind of the basic services of water and wastewater treatment. A growing number of utilities are now moving toward what many are calling the utility of the future. Some of that is driven by a document that was put out about a year and a half ago by NACWA, WEF, and WERF, called the Utility of the Future Blueprint, and a number of utilities are moving in that direction. And I'll talk a little bit more about that in a little bit. Size is not the only determining factor in terms of where a utility stands in terms of sustainability. So I don't think it's fair to assume that small utilities are the only ones that struggle or large utilities are the only ones that are really moving ahead, you know, most aggressively toward the future. It really is not the most important factor. The Effective Utility Management framework, which I'll talk about next, which is based around a series of attributes of effectively managed utilities and keys to management success, provide the foundation for this document and really the foundation for the work that we do at my office on sustainable and resilient utilities. And so what brings it all together – or, in this case, what takes it down to another level -- are what we call sustainable practices, and that's what this document is all about.

Slide: Municipal Water Systems Sustainability Continuum

So moving to the next slide, I like to use this slide when I brief people here or talk to outside audiences. I call it the Municipal Water Systems Sustainability Continuum. This is by no means a precise document, but I think it gives you a pretty good sense, using kind of the standard bell curve model, about where we see the utility community sort of at large in terms of moving towards sustainable operation. So you can see, over on the left-hand side, there are some systems that are not viable and perhaps never will be. A number of systems are moving toward compliance, and compliance is the goal. That's a laudable goal, but that's as far as many think that they need to get or are able to get. In the middle is sort of a larger range of utilities, in the middle of the curve, where they're saying compliance is good enough, but they're open to new ideas that can move them further to the right on this curve. The next quadrant is a group that we call willing and able to become sustainable. This is probably the most interesting group, in my mind. We believe there are numbers of utilities out there of all different sizes that want to move toward what we would call fully sustainable operations but are still looking for sort of the right set of incentives or other factors to really help them move further in that rightward direction. And then over in the right-hand side are utilities that can say, we're there. We feel like we're doing everything we can to optimize but also move toward the future. This is probably a smaller quadrant than I reflect on this map, but there are utilities that are certainly over on the right-hand side. So this is nothing precise but a good way, I think, to sort of describe this continuum that we see as we work with utilities.

Slide: Where does this document fit?

So moving to the next slide, where does this document fit? Again, this document is designed to give utilities of various sizes a very practical, usable tool to improve their operations and move toward what we call sustainability, something that you could use now. It's not just an aspirational document. It's very much an operational document. The document is based on a series of proven and effective practices, very specific practices that are being used now by utilities. They were suggested and modified and edited many times by a group of utility managers from around the country, and you can see their names as you open up the document when you go online. But we can't thank them enough for all of the work they did in helping us to put it together. As I said earlier, this document is designed to help utilities make the connection between setting aspirational goals and achieving tangible results that can be measured through the adoption of sustainable practices. The document is very much hard wired to the Effective Utility Management framework. That is the ten attributes of effectively managed utilities and keys to management success. Consistency was the key. As we worked with our utility steering committee, they made it clear to us that we need to stick with that framework because it's something that's being understood more and more all the time in the industry, and people are comfortable with it. So they said, whatever you do, organize it around that framework. So we did. Down at the bottom, you can see a common website that EPA and our association partners have put together with all kinds of information about the Effective Utility Management initiative.

Slide: Our Foundation: Attributes of Effectively Managed Utilities – The 360° Look

So moving on, this is just a circle that we use -- and I use all the time in presentations -- which shows the ten attributes of effectively managed utility around the edge, you know, that you can see in the circle there. I like to call this the 360-degree look at your utility because that's what Effective Utility Management is designed to help you do. It doesn't tell you what your priorities need to be. It says use an assessment to determine what your priorities ought to be among these ten attributes, and then set a goal, or develop a roadmap, as we say for this document, for moving forward. But those are really the ten foundational pieces that drive our work here.

Slide: How We Got Here

How we got to the document is fairly straightforward. I won't spend much time on this, but just note that it came out of a series of recommendations that were made by leading utilities way back in 2012. They said one way to help promote the greater adoption of the Effective Utility Management approach would be to tie these attributes to a series of selected practices through a roadmap document. And the other points on this slide just tell you how we got there. Again, it was very much a collaborative process. We don't do anything here without asking utility managers like you to become involved from the beginning, and I think that's served us very well.

Slide: How the Document Works

So how the document works, and you can see this as you open up the document online and read through about the first eight or ten pages. But again, it uses the same Effective Utility Management framework that we're using here, utilities around the country are using, and that we're now using in a slightly modified format for very small systems through a partnership with the US Department of Agriculture. Based on ten core management areas or attributes, also includes a planning and performance measurement aspect of the roadmap document because planning, obviously, at the front end is so important, you know, to the kind of infrastructure that

you ultimately decide but also the practices that you need to adopt in measuring your performance on the back end to determine how well you're doing. So each of the practices among the ten attributes is organized into three levels. Level one is what we call adequate fundamental services. This is for utilities who feel like their goal at this point is to be able to provide consistent adequate fundamental services. Obviously, a pretty heavy focus on compliance in this particular level one, and that's just fine. Level two we call the optimizing level. Again, as I said earlier, that really lays out additional practices beyond providing adequate fundamental services that allow you to really optimize and, you know, sort of drive out the last molecule of inefficiency in your operations in kind of the traditional water and wastewater paradigm that most utilities are still using. Level three is a very interesting level. Those are a series of practices that allow utilities to think about transforming some of the services for the future, again, based on -- in some ways, based on the Utility of the Future Blueprint document that NACWA, WEF, and WERF put out. For example, a big focus on resource recovery, economic development, watershed protection, a whole range of things under level three that certainly don't – that build on level one and two. They certainly don't throw level one and two out. They build on levels one and two but really allow those utilities that feel they need to transform the way they provide services and provide additional services to do that. The levels are not bright white lines. They are simply there to help you as a utility set your own priorities and determine where you want to go using the practices. We call this a progression model, but the document doesn't say at what pace you should progress. It lets you choose that for yourself, obviously.

Slide: Other Things You Should Know

So moving on here, a few other things you should know quickly. Again, we call this the roadmap document, but it does not define one roadmap for all utilities to follow. It really helps you define what your roadmap should be using the practices, using the management areas, and using sort of the rate of progression that you think that you want to adopt. The practices themselves are not comprehensive. We purposely did not want to create what I call the New York City phone book. These are practices with a purpose, identified by utility professionals, but will help you gauge your current performance and progress over time. The practices can be scaled and implemented regardless of the utility's current capacity or size, and as I said earlier, the three levels are practice are an informal – emphasize informal – progression model. But you choose the pace of progress based on your needs, i.e. develop your own roadmap. And that's very important to note.

Slide: How to Use the Roadmap

Some key steps on how to use the document. Number one, assess your current operations and identify priority management areas to focus on. There are a couple of assessment tools available there. One is based on the original EUM framework, and another one is based on a version of that that we developed specifically for very small water and wastewater systems. Next step would be to identify the practices in the priority areas that you have identified to understand where you stand, what your current level is, and what you want to achieve, where you want to move up the levels. And then also, to identify practices that you have in place or missing that would allow you to develop your own roadmap, again, at a pace that's consistent with your current capacity or, more importantly, the needs of your community.

Slide: Next Steps – National Webinar Series

So this is the second, as Andrew mentioned, the second in a series of at least four webinars. So this slide is a little off base, but we probably think – we probably think we will do at least three more. The format that we're using today is one we will use in the future. I will speak about the roadmap but, importantly, we will have at least two utility speakers on each webinar to talk about their efforts. The next bullet is a little out of date. This is the webinar that focuses on resiliency. Our next webinar will be in the spring, and we are still looking for a topic, deciding on a topic that we want to focus on. The resource directory is included in the most recent version of the document, so that's a nice little added feature that identifies a whole range of resources, organized around the key management areas, that you can also refer to. Those are resources developed by EPA, other associations, a whole range of resources that might be useful to you as you use the roadmap document. Also, again, as Andrew said -- and I always like to repeat this -- our association partners have been very generous in co-sponsoring these webinars, and we see them as partners going forward and will continue to rely on their good offices but also their members.

Slide: Today's Focus: Operational Resiliency

So today's focus, as we said earlier, is on what the roadmap document calls operational resiliency. The practices in this section of the roadmap are organized around three elements: Risk assessment and reduction planning, emergency response planning, and recovery and mitigation. Again, they allow you to assess your current resiliency program and develop your own roadmap for moving in whatever direction you need to move among the levels, again, i.e. to construct your own roadmap should you pick operational resiliency as one of the key elements that you want to focus on. And again, that choice about what the priorities are are obviously your choices.

Slide: Thank You!

So I want to thank everybody again. I really would encourage you to use the document. We are road testing, as I like to say, road testing the document with about eight utilities around the country just to see how to works in practice. We're pretty confident that it will work well, but it's always helpful to have that kind of road test. But anybody else that's interested in using the document, we would really encourage you to do that. I'm always available, either through e-mail or telephone calls, for any questions or any other information that you'd like to have about the effort. But this is a document designed to be used. It is a true living document. I'm sure we'll be updating it as new practices come online and as we learn more from those people that are road testing it. But again, the roadmap document is the basis for these webinars, but, most importantly, I'd like to now turn to our first utility speaker, Kathryn Sorensen, who's with the City of Phoenix Water Services, for our first presentation. And Kathryn, thanks so much for being here. We're really excited. You folks obviously face a lot of the challenges out there, certainly around drought, but many other things. And so thanks again for being with us today.

Slide: Phoenix Water Supply Sustainability and Resiliency Strategies

Kathryn Sorensen:
Thank you. I'm happy to be here. Okay. I'm going to get my presentation started here. I will go through this relatively quickly. Can you guys see my presentation okay?

Morgan Hoenig:
Yep. Kathryn, if you could just enter presents presentation mode, that would be great.

Kathryn Sorensen:
Okay. There it goes. How's that?

Morgan Hoenig:
All good. Thanks.

Kathryn Sorensen:
Fabulous. So I'm happy to report that it's partly cloudy here in Phoenix, and it is actually raining and snowing up on our watershed, so that's good.

Slide: Phoenix's Water

All right. So I'm going to take you through a brief overview of Phoenix's water and some of our challenges related to both sustainability and resiliency.

Slide: Phoenix Water Services

A quick overview of who we are, it's a very large utility, one of the largest in the US, approximately 1400 employees, and we serve about 100 billion gallons of water a year. I think, in acre feet, that's about 300,000 acre feet.

Slide: Phoenix's Vulnerabilities

So it seems obvious, but Phoenix is not particularly vulnerable to natural disasters. We don't have some of the challenges that other parts of the country experience such as hurricanes and tornados and blizzards. Dust storms are not a natural disaster. They make for great pictures, but they're actually a natural occurrence here. But it is very hot and dry here. And research down at the University of Arizona, when they first started the science of studying tree rings, tells us that mega-droughts occur on our watersheds that literally decimate civilizations. So we know our vulnerabilities, and, of course, since we're a desert city, we know the value of water. And therefore, Phoenix is built for drought, and that's really been the focus of our efforts over the past few decades.

Slide: Sustainability

So historically, we focused on ensuring sustainable water supplies to provide for growth and continued availability during drought. Phoenix has really boomed since World War II, particularly kind of in the '70s, '80s, and '90s, so lot of our focus was just on making sure we had enough water and that we would have enough water under drought conditions. So to achieve this, we really took the long-term view, planning out for at least 100 years. And in fact, cities here in the Valley of the Sun, in order to grow, are required to be designated with a 100-year assured water supply through the Arizona Department of Water Resources. One of our main strategies was to acquire more surface water than we really needed to meet current demands, and really for two reasons. One, to provide for future demands, but also to provide a buffer for times of drought. And also there's just kind of a – it's just kind of accepted here in the Valley of the Sun that whatever water you can get your hands on today, you should, because water is going to be more difficult to find in the future and certainly more expensive. So we really went about acquiring, physically and legally, a diverse basket of water supplies. This includes water from the Colorado River, Salt and Verde River water, which is our local source, groundwater, reclaimed water, and then storing water underground, as well.

Slide: Sustainability Continued

Also it's really important to know, here in Arizona, about the third of the land is in the form of Indian communities. And those Indian communities tend to be – tend to share watersheds with the rest of us. So it's really important that we settle our disputes, what have historically been disputes, with the Indian communities. Water out in the west is based on the law of prior appropriation, and basically that means – or it's the Doctrine of Prior Appropriation. And basically, what that means is that if you used the water first in time, you have the highest priority right. Well, as you can imagine, native communities were here first, and they have very high claims in priority to those water supplies. So a lot of the last 20 years has been focused on Indian water right settlements, and these have been a great boon to Arizona. Really, what they do is provide certainty. We have a better sense of who owns what water supplies, and we've built really strong relationships as a result of these settlements. So it's difficult to overstate the importance of these settlements.

Slide: Sustainability Continued

We also developed a system of aquifer recharge. We do it in a couple of different ways. We deliver water out to areas that are close to riverbeds. And of course, here in the Valley of the Sun, our riverbeds are dry. I know that's not the case elsewhere. But we deliver these surface water supplies to land that's close to those riverbeds where the soil is very porous and the water can percolate easily into the aquifer. So we've been storing an unused apportionment of Colorado River and Salt and Verde River water for quite some time now. We use it to recharge the aquifer and provide a supply for the future and for drought protection. We've also focused on developing wells that can both pump and recharge, and that's been very important for us, as well.

Slide: Sustainability Continued

We've been reclaiming all of our wastewater and reusing it for quite some time. Actually, I believe our first agreement for reuse was signed in 1973. So you're a desert city, like I said, you know the value of water. And so we've known the value of reclaimed water for quite some time. All of our wastewater is reclaimed. A very large portion of it is actually used for nuclear power generation. There's a nuclear power plant to the southwest of Phoenix. It's kind of interesting. To my knowledge, it is the only nuclear power plant in the US that is not located on a major body of water, and the reason that it's able to exist out of the middle of the desert is because of the steady supply of reclaimed water for its cooling purposes. And that also, obviously, is an important nexus between water and power. A lot of it is also used for agriculture and in local wetlands. And then, through one of the Indian water rights settlements, we actually exchange reclaimed water for Salt and Verde River water, so it's a way of taking at least what's today not a potable supply and converting it into a potable supply. We also, obviously, focused on water conservation. You can imagine how important that is to us here in Phoenix. Phoenix was one of the founding members of the "Water – Use it wisely" conservation program. Here in the Valley of the Sun it enjoys really tremendous name recognition, and it's a very unique type of program. There's obviously a lot of media outreach, all the traditional forms. But also, if you go to the website, it has very useful facts and information for homeowners and for businesses. It gives them the tools that they need to really change their behavior. And Phoenix's residential gallons per capita per day consumption has fallen by approximately 30 percent over the last 20 years. We think that a big part of that has to do with our customers embracing a desert lifestyle, and we're very proud of that. And of

course, we formalized all of this in various plans – water resource plans, water conservation and drought management plans.

Slide: Sustainability Continued

But one of the areas where Phoenix really focused was on using renewable surface water supplies directly so that we would not use local groundwater supplies that are really fossil supplies. So the Valley of the Sun, if you know its geography, there are mountains to the east, northeast of us, and they supply the snowpack and the snow melt that then comes downstream to us and is gathered at Roosevelt Dam and various dams on the Verde River. And then what used to flow past those dams back in ancient times actually filled the valley with a very generous supply of groundwater. But it's a fossil supply. It does not recharge at significant rates, at least not compared to, in modern times, how much we pull out. So with the passage of the 1980 Groundwater Management Act here in Arizona, which was really very cutting edge and important for our sustainability, the city of Phoenix, prior to that time, had been using Salt and Verde River water within the boundaries of the Salt River Valley Water Users Association. And I'll talk about that a little later. But for lands outside of those boundaries, we were basically just pumping that fossil groundwater. So Phoenix intentionally built the surface water infrastructure necessary to use the Colorado River supplies directly instead of using those fossil supplies because that was the sustainable thing to do. We were saving those fossil supplies for the future. And I think that's really important. But as a result of this, Phoenix basically abandoned its groundwater well program. And today, we can only meet about three percent of our peak demands with wells. And I'll circle back to that in a minute.

Slide: Sustainability Continued

But the results have been good. Our pursuit of drought protection and sustainable supplies has so far served us well. Fifteen years into the current drought, and we still have more than enough of the water we need to meet supply – to meet demands on an annual basis. So that's the good news, but there's bad news coming. Don't worry.

Slide: Phoenix's Water Supplies

So going into a little bit more detail about some of our supplies, I want to kind of contrast sustainability versus resiliency for you and what that means for Phoenix. So the Salt and Verde River water, which are local rivers, local watersheds here in Arizona, they supply more than half of our demand, the source of snowpack from the mountains to the east of us, and the dams and canals are administered through the Salt River Project, which was the Bureau of Reclamation's first and arguably most successful project. It's really the reason that Phoenix is here today in the form it is. At the time – well, Phoenix was settled as an agricultural valley, and the farmers experienced long periods of drought followed by periods of extreme floods and really made life difficult for them. So they gathered together and pledged their lands as collateral in exchange for construction of the Roosevelt Dam. And so those lands now create the boundaries of the Salt River Valley Water Users Association, and the benefit of that water can only flow to those lands. I can only use it within those boundaries. I can't use it everywhere in my service area. The city now receives that water at our treatment plants, and then we distribute it back to those same lands through the potable distribution system. And those water rights stay with the land.

Slide: Phoenix's Water Supplies Continued

So on the Salt and Verde River system, Phoenix's water rights, they're very senior in the system. We enjoy very good rights to that system. And what's nice is that the water allocations are governed by a local board, and that board can vote to reduce allocation to all of the shareholders to protect the reservoir in future years. So when we're entering into drought conditions, they can cut back those allocations to make sure that we have enough water for future years. In addition, when the drought – the current drought -- got really, really bad, back around '02, '03, SRP kind of took a look at the situation and said, you know, we need to drill more wells. And they've done so and done an excellent job in that. And these wells, they drilled the wells, but they can also feed into the canal system and provide full redundant supplies during drought conditions. Currently, Phoenix only uses about half of its entitlement to these waters, and the users, as a whole, of the system do not use all that is available to them every year. And so basically what that means is that there's some give in the system. Some water is held back and benefits future availability, and that's really important as a buffer during times of drought.

Slide: Phoenix's Water Supplies Continued

So if you compare that to the Colorado River system, it's kind of the opposite for Phoenix. Currently, the Colorado River supplies less than half of our demands. For those of you who don't know, by the way, the Colorado River is delivered to central Arizona through the Central Arizona Project canal. It has to be pumped uphill, which is also the opposite of the Salt River system. It's pumped uphill to Phoenix and then eventually to Tucson, as well. The source is snowpack from the Rocky Mountains, and the Canal is owned by the federal government but administered through the Central Arizona Project. Phoenix's water rights are contractual. They're not appurtenant; they're contractual through an allocation.

Slide: Phoenix's Water Supplies Continued

And here, again, we kind of have the opposite situation as Phoenix has on the Salt and Verde River system. The Central Arizona Project rights are junior in the lower Colorado River basin. There are different levels of rights within the CAP system itself, and within the CAP, Phoenix's rights are relatively senior. But what puts us at risk, of course, is that the CAP rights are junior in the basin. So that means that the CAP takes cut to its allocation before California does in times of shortage on the river. For the most part, water allocations -- instead of being handled by a local board that can make decisions unilaterally, the allocations are handled through what I think is one of the most complex systems possible, although humans have quite an aptitude for bureaucracy, so I'm sure we could come up with something even more intractable. But it's called the Law of the River and basically it's a series of international – an international treaty with Mexico, interstate compacts, Supreme Court decisions, various other contracts. It's very complicated, and it's very difficult to make changes. That's not to say that we can't and haven't, and the stakeholders have been able, in the past decade, to come together and respond to drought and other issues. But it is very difficult and takes a lot of time. Also, the Central Arizona Project, for Phoenix's purposes, it's basically a canal company. Its obligation is to deliver what water is available to us. It does not have well redundancy, so we are a little bit at risk there, as well. Water – Colorado River water that Central Arizona was not using to meet current demands was being stored and, I think, is still being stored in aquifers in central Arizona through the Arizona Water Banking Authority. So there is some redundancy in terms of water being stored in aquifers as a buffer. But there's no wells, and it's, at this point, unclear

how that water is going to be pulled back out. I know the water bank and the CAP are working on some plans, but we don't know the result of those plans yet.

But one thing that's interesting is that – so the city of Phoenix only uses about two-thirds of the Colorado River water that it's entitled to on an annual basis. But what we do not use does not sit up in Lake Mead with our name on it where it might benefit water levels in Lake Mead. Instead, the way that those allocations work, that unused water is turned back to the CAP, and then the CAP remarkets it to the next highest priority user. So the water that we save just goes to someone else. And really, what Phoenix thinks is the biggest issue on the Colorado River is that every – with some small exceptions, every single acre foot available on the system is allocated every single year. And this creates a system that has very little give. When you add to that the fact that the river is very likely over-allocated, that certainly makes things even worse. So we're using every acre foot every year in a system that is over-allocated, also. And then, of course, climate change adds a nice little mix to that. We know that – we believe that the chances of kind of windfall snowpacks that we've depended on in the past, that those chances are much diminished for the future. So that's kind of scary. So there's just no – there's not a lot of give in this system for us.

Slide: Phoenix Resiliency Strategies Continued

So it's kind of ironic because, like I said, Phoenix gave up a lot of its wells and got off of the fossil groundwater supplies so that it could do the sustainable thing. But really, that, in the end, made us less resilient to the types of drought that we're seeing on the Colorado River now today. So we're focused – our resiliency strategies kind of exist at three levels. At the local level, obviously we're in the process of drilling more wells. We want to build up more of that resiliency. But we really don't want to deplete the aquifer for future generations. So we're focusing on wells that can both recharge and pump. And then we're also building pipelines and pumps that can move some of the Salt and Verde river water to areas that have traditionally been sort of Colorado River water. Water that is part of the Salt River Valley Water Users Association we can't move outside of the boundaries of the association, but Phoenix does have some independent rights to Salt and Verde River water that we can move. So we're focusing on that.

Slide: Phoenix Resiliency Strategies Continued

At the regional level, we're trying to leverage infrastructure with partners. You all know as well as I do how expensive infrastructure is in this industry. One of the things we did recently is we entered into an agreement with the city of Tucson because we took a look around and went, man, we need to drill a lot of wells. But then we realized that the city of Tucson has very ample well capacity. Their system basically relies entirely on wells. What Tucson does is they take their Colorado River water and recharge it into the aquifer and then draw it back out of their well field. So what we figured out is that we could – the city of Phoenix could send some of its currently unused Colorado River water down to the city of Tucson, and Tucson could recharge it. This buffers – or improves Tucson aquifer levels, makes pumping a little bit less expensive for them. So they kind of get an immediate benefit from that recharge. And then the deal would be that, in the long-term, if there's a shortage on the Colorado River and Phoenix needed that water back, it would make a call on that water. Tucson would pump the previously stored water out of the aquifer, and then, whatever surface water off the Colorado River that Tucson would be entitled to in that year, it could send to city of Phoenix canal turnouts into our surface water treatment plants. So really, it was a way of leveraging existing infrastructure rather than going

out and building a whole bunch more wells, which would kind of be – well, it would certainly be more expensive, but just less efficient. We're also looking at doing the same thing, here in the Valley of the Sun, with some other local utilities that also have ample well capacity.

Slide: Sustainability vs Resiliency

So then, at the system level, you know, Phoenix can take various actions to make itself more resilient in the face of drought. But ultimately, we depend on a system that is itself not particularly resilient. And so we want to work with other stakeholders to make that system more resilient. We want to see a Colorado River system with some give in it. And that's why Phoenix is very supportive of the concept of the Colorado River System Conservation Program. And the idea behind this is simple. It's that we find a way -- and it will be difficult -- but we find a way to make sure that there is some water in the system that is just allocated to the system. It's not allocated to an individual user. It's there to protect reservoir levels. And we think this is important because it helps provide both hydrological and political stability in the regions.

Slide: Sustainability vs Resiliency Continued

So what we did with our council – so councils are obviously familiar with sustainability. We've been talking about that for a long time. But resiliency is still new. And in our mind, the difference is that sustainability is about making sure future generations have a water supply, which is great, but resiliency is about ensuring that those supplies can resist and survive really bad scenarios. So under kind of our old way of thinking regarding sustainability, we would have shown a chart something like this that shows, oh, look, we've done some projections, and our most likely scenario shows that we have ample supplies to meet demands and we're, therefore, sustainable. But that's not what resiliency is about. So what we did is we introduced council to the concept of the black swan. And I know it sounds gimmicky, but some technological super genius here at the City of Phoenix was actually able to make that swan move, and the council loved it. But we showed them a range of scenarios, and we introduced them to the concept of the black swan in that we need to focus on resiliency so that we are not in black swan situations. The black swan theory kind of came out of, I guess, history, and it's this idea that history has been swayed by unexpected, unpredictable, very large, stochastic events. And that's exactly what we want to protect against. The city of Phoenix is relatively secure. I don't want to jinx us. We're relatively secure in terms of sustainability, but we want to make sure that these systems we rely on don't just completely tank. That's our black swan. So we talked with council about these ideas, about protecting against the probably rare and probably unlikely scenarios but scenarios that, if they happen, are extremely catastrophic. And what we did is we gained council approval of a resiliency fund item in the existing CIP. And what this did is it really called out resiliency as a very specific objective with political weight. Back – I'm sure it's the same for your utilities – back 15, 20 years ago, we were all talking about sustainability and getting political buy-off on that. We felt it was important to get political buy-off on the idea of resiliency, as well. And it allows you to designate specific resources, and it sends a signal to your stakeholders, economic development community that you know your vulnerabilities, and you're dealing with them. Also, in our case, it sends a signal to other Colorado River stakeholders that we want to find system-wide solutions, that we are here to work with others to make the system more resilient.

Slide: Sustainability vs Resiliency Continued

So to summarize, you can see the strategies that we have pursued. We have planned for the long-term. We settled our disputes. We gathered, diversified. We promoted a culture of wise water use, and we pushed to change outdated and inflexible government structures. And we included resiliency as a very specific objective in our capital plans.

Slide: But in the End…

But in the end, of course, you have to expect the unexpected. This is a picture of the I-10 in Phoenix. This is what happens when four inches of rain falls in the course of 24 hours in our community. We are not capable of handling it, we know from experience. That's like the equivalent of a thousand-year flood event for us. We only get about eight to ten inches a year, to put it in perspective. The picture on the lower left is one I took, and unfortunately that's my finger in the corner of the picture there, but that was the day that I gained newfound respect for the utilities on the East Coast that have combined sewer and stormwater systems and experience these types of problems every time it rains. This is what it looks like when our sewer system is completely overwhelmed and running down Lower Buckeye Road. So that was an interesting experience for us. Okay. And that concludes my presentation.

Jim Horne:
Kathryn, thank you very much. That was great. I look at those cars, and I say, is that some sort of demolition derby going on there? Thank you so much. You not only gave a presentation, you told a story, which is always important. So thank you very much. We appreciated that – appreciate that very much. Let me turn it over now to Daryl Slusher. Daryl is the deputy director of Austin Water Utilities in Austin, Texas. I must confess I went to the University of Texas in Austin many years ago, when Austin was about maybe half the size that it is now. I was down there last week at the WEF/AWWA Utility Management Conference, and I couldn't believe my eyes. But what is clear to me -- and Daryl will focus on this -- is how the drought has really affected that part of the country. In the hill country of Texas, I took a drive one afternoon, and the rivers look like tiny little creeks. And so Daryl is here again to talk about a very aggressive and well known conservation and drought response program also that affects rates in the city of Austin. So Daryl, thanks very much for joining us, and take it away.

Slide: Water Conservation, Drought Response & Rate Restructuring in Austin: Springboards Towards Resiliency

Daryl Slusher:
Thank you. Thank you, Jim. And Jim is correct that things have changed a lot in Austin over the last 30 or 40 years. And he couldn't believe it. Some of the people here, the old timers here, they can't believe it, either. So I'm going to move on through this now. I apologize my voice is a little raspy. I apologize to everybody. I've got some allergies that blew in over the weekend. But I'm just going to go right straight to show you our water source.

Slide: The Setting...

We're in a drought here since March 2008, so that's what I mean by the setting.

Slide: Lake Travis, before the drought

This is not during the drought. This is Lake Travis before the drought, and it's one – Lake Travis is one of two reservoirs that supply Austin. They're managed by the Lower Colorado River Authority, who's a quasi-state agency that manages the lakes. These lakes are -- they're the dammed Colorado River upstream – excuse me. I didn't mean to do that – upstream from Austin, or the Colorado River flows right through Austin. I want to point out that's a different Colorado River than Kathryn was talking about for Phoenix. There's even a song about that we have here, Jimmy Dale Gilmore, there's another Colorado. And we're talking about this one, although some people in Texas might think that other one is the other Colorado.

Slide: In drought

But this is before the drought, and this is now. Or it might be a little bit higher than this, but not much right now. So we've been in this drought, like I said, since March 2008. The Colorado River is Austin's sole source of water. We have water rights to more than twice as much as we're using, but that water has to be in there, in the lake, for us to use it.

Slide: Graph - Gaged Inflows to Lakes Buchanan and Travis

So move on from there. Here's a graphic illustration. I realize this is a little dense, but you can probably capture what it means on the – these are months and then divided out from 2011, which was the worst year of the drought so far, through 2014. The blue on the left-hand of each set of columns, that's the average inflows to the lakes since they were built in 1942. By the way, they were built – Lyndon Johnson was the congressman from this area and got all that through when he was – real early in his congressional terms. But the blue is the average inflows, the dark blue, and those others are each year '11 through '14. As you can see, we're behind every – every time – only one time during the drought, or at least since 2011, have we even for one month made it over an average flow. In 2011, they were 11 percent of the average. So know this is really serious. We've been focused on climate change here for a long time. Of course, you can't say if this drought is a part of climate change, but we are treating it like this could be a permanent shift to a drier climate. Also, Austin is on a geological dividing line. The 98th meridian is just west of town. Usually get less than 30 inches of rain west of that, more than 30 inches east of it. We're concerned that line might be shifting.

Slide: Graph - Cumulative Inflow to Lakes Buchanan and Travis in Central Texas

But on the other hand, you've also had droughts in Texas, looking at tree ring studies – somebody mentioned tree ring studies earlier. There's tree ring studies going back to about 1500 that show that we've had droughts that are longer and more severe than the one we're having now. Now, the drought that people talk about that's legendary here in Texas, that people -- have been books written about is the 1950s drought. That was actually 1947 through 1957. And so it's used as the drought of record here to determine if we're in a drought worse than that one. And so we've been following that at Austin Water for a long time throughout the drought.

And this is what we call our uncharted territory graph. And if you look, the gray line starts in June 1947, the beginning of the 1950s drought, and then it follows monthly the inflows into the Lakes Travis and Buchanan, the two reservoir lakes I was talking about. And then the red line is March 2008, the beginning of the current drought. And you can see, for about the first five years, they tracked each other really closely. But then, at five years into the 1950s drought, there was big storm and big rains, and the lakes went up about a million acre feet, where

we've just kept going off into this uncharted territory. We're 1.7 million acre feet behind the pace of the 50s drought. And the Lower Colorado River Authority, that I mentioned earlier, that managed the lakes, they just said that evidence is they think this is worse than the 50s drought. They've been sort of, we think, a little slow to say that, but they – in their position, they probably should be cautious. So one thing we're saying around here is this is not your grandfather's drought.

Slide: Higher Rainfall but Lower Inflow: A Climate Paradox

Now, here's another paradox that we're dealing with as part of this, is that we've looked, and actually, the rainfalls over the lakes during this drought have been slightly higher than in the 1950s drought of record, yet the inflows are dramatically lower, like I was showing you in that first chart or graph that I showed you. And so we think probably the reason is that the higher temperatures are leading to more rainfall being absorbed into the ground rather than getting into the lakes. Probably also a factor is that there's more upstream impoundments like stock tanks that are reducing the flow. They also raised—looking at this -- we're working with them on that. Other folks are looking at it. But we're planning that this could be a permanent change, where you don't get the same amount of inflows into the lakes compared to the same amount of rainfall that you did in previous decades, let's say.

Slide: Drought Response

So what has Austin been doing about it? Actually, luckily, I guess, foreseeing things, maybe. I wouldn't necessarily claim that, but Austin started strengthening its water conservation programs in 2007, had conservation programs since the mid-80s, but they had sort of plateaued.

Slide: Multi-Faceted Strategies

So that's one thing we're doing. We're working with the LCRA and others on enhancing regional water management, getting a new water management plan. We're doing – we're taking steps to augment the water supply, which I'll show you in a little bit, and we're developing an Integrated Water Resources Plan. And Jim and Mr. Sawyers also mentioned revenues and finances had a dramatic impact on our finances, our drought response has, and I'll talk about that, as well.

Slide: Regional Collaboration to Enhance Water Management

So one of the first things we had to do is deal with this concept called – we're called firm customers, city of Austin, and we're the biggest city by far that gets its water from the Colorado and from the highland lakes. And there's a few others upstream. And then downstream, there are rise farmers who are called interruptible customers because they pay a lot less per thousand gallons and can be interrupted in times of drought. But that had never happened before. They tend to use about three and a half times as much water in a year as the city of Austin. And so, along with the LCRA and the others, we had to move -- and we regretted having to do this, but the rice farmers have been cut off through emergency orders for the last three years, probably will be again this year. If you look at that graph I'm showing you, you can see why that was necessary. And we've also moved to get a new water management plan, which there's one pending before the State Environmental Agency.

Slide: Drought Stages

Okay. So that – we had -- that's just a step we had to take, really had no choice. And the lakes have stabilized during that time even though the inflows and rainfalls have been really low.

Now, this, like I told you, we had strengthened our water restrictions, our water conservation programs, beginning in 2007. And you'll be able to see that, the impact, on the graph I'm going to show you later. But here's some of our – we also set up a drought response plan which has stages in it. And the state requires you have a drought response plan. I think ours is probably more detailed than what's required, and that's a good thing. And a lot of that is because our citizens here in Austin are very environmentally sound, very environmentally conscious, very active, and have these values. And people have responded to these programs we put in place. So the conservation stage, that would be all the time except when the lakes go down further. It's twice a week water, and that's been our biggest – biggest conservation measure, is just having what we call mandatory – that doesn't mean you have to water. That means you can only water these two days a week. And that was – and in stage one, you reduce the hours, but you're still twice a week. Now, stage two, that's what we've been in all but about a month and a half since 2011, and that's one day a week watering. Like I said, it's not mandatory that – maybe I should word that a little differently. Mandatory means you can only water on one prescribed day per week. And I'll show you a slide in a minute that goes into a little bit more detail on how that works. And we're at that – we've been in that level, like I said, for over three years now. If we get down to -- the lakes are now at 36 percent full, 36 percent volume. If we get down to 30, which predictions show, if the dry conditions continue, that could happen this summer, then we'll have reduced hours, and we'll have a drought surcharge go into effect. It would cause an impact on our rates. And then, if it gets worse than that, down to about, say, 20 percent or so, which is really dangerously low, then we would go to no outdoor watering at all. And one thing we're doing now is we're looking at an interim stage in between those two, which would be hand watering only, where people could still go out and water their trees, their plants with a hose, but it would wipe out no more irrigation. We're not at that point yet, but we have these stages already in place in our city ordinances to go there, depending on the lake levels.

Slide: Austin's Stage 2 Restrictions

This is just a little bit more about the -- what we've been for about three years. One day a week, can't wash your car at home, no charity car washes. It might sound a little tough, but folks just have to find other ways to raise money because it's a really serious situation. Restrictions on fountains, patio misters, cut the hours down on that. And in restaurants, they don't give you water unless you ask for it. We're not trying to discourage people from drinking water, just not wasting it. And you see this graphic over here is something we passed out to the citizens. It might look a little complex, but people have done a really good job of figuring this out. And we actually also have – excuse me – enforcement personnel which will drive around and give warnings and then write tickets if people are violating the water restrictions.

Slide: *Reclaimed: Austin Water's 3rd Utility*

A couple of other things we've done, we have a reclaimed water program which has really expanded over the last few years. That one down at the bottom middle there, that's our 51st Street reclaimed water tank. It's won some design awards. And the reason this is designed like that is because a lot of citizens insisted on that. We have, down in the right-hand corner there, we have reclaimed filling stations, where trucks can come and fill up with reclaimed water. Our

Parks Department is the main user of those. So we've spent a lot of money, built out the reclaimed system, and we're in the process of bringing on new customers.

Slide: Graph – Reduction in Leak Repair Times

Another thing – by the way, our reclaimed so far has been mostly irrigation and cooling towers. And we're going to move into experimental things like toilet flushing in large buildings, probably do some pilots on that and move towards that. Now, this slide here, another thing we've done -- and this precedes the drought, but it was really intensified during the drought -- is we've tried to establish a water conservation consciousness throughout the water utility, not just have one division that's responsible for water conservation. So this is where we invest in our workforce. We added about 20 people to our pipeline crews to the leak response, part of pipeline crews. And you see what this chart shows is, back in 2006, we had more than 50 percent of our leaks took more than three days to respond to. And we decided that just wasn't acceptable. Now we've got it down to below ten percent that take more than three days, and then almost 80 percent that are done in one day or less. We're really proud of that, and we think that shows that pretty much everybody here, working at Austin Water, is an environmental worker in one way or another. And these folks that are working very hard on the front lines, fixing these leaks, certainly fall into that category.

Slide: *GPCD on the decline in Austin!*

And you'll notice a lot of this has been on conservation because our council has told us -- our city council, the governing body, has made clear that's what they want us to do first is to conserve. We agree with that and have been doing that for a long time. You can see 2006 was the last year before the water and restrictions were strengthened. That – if you look that, this is the gallons per capita per day. It was 190 in 2006. It was 125 last year. And you can see that our program just sort of plateaued up until 2006, and then it started dropping off. Another thing I'll get to in a minute, though, is that this chart could also be our financial revenues chart, which presents a real challenge.

Slide: Austin Total Annual Pumpage and Population

But let me go to this one, though, just to show, rather than just gallons per capita per day, our total use. We dropped – even though we've added over 130,000 residents since 2006, we're using less water. And you can see, before we started strengthening those programs, the water use was going up commensurate with the population. So we're proud of doing that, and it's really the way our citizens have responded to the calls to conserve and to the seriousness of the drought.

Slide: Water Conservation & Drought Response Alter Traditional Financial Patterns

Now, just to turn it to the finances, I'm going to show you here, this is – I think most of you all know that out at utilities, but the traditional pattern has been, in a dry year, revenues go up because more people are watering their lawns. In a wet year, revenues go down because they're not watering their lawns. But traditionally, that worked out over time. Things went along pretty well. But now, particularly for us, because we tied our drought restrictions to lake levels, which has a lot of logic to it, but now, you get a dry year, revenues go down. You get a wet year, revenues go down or don't recover. Sometimes here we have had the worst of it because we had

Slide: The Arithmetic of Drought Response and Conservation – Impact on Rates

-- for instance, October 2013, we had nine inches of rain over parts of the city, at least five throughout the city on Halloween, and out over the lakes, some – they were below one inch at most areas out there. So we've been in those kind of wild patterns, too. So a whole combination of that has hurt our revenues. I probably won't read every line on this chart, because I think most people understand this, but this is something we've had to take out to the community because not everyone in the community understands this and said, why are you – I conserved, and now you're raising our rates. So this is an example of what we've taken out to the community, the arithmetic of drought response. Basically, what it says is that even though you reduced water use, and that has a lot of great benefits, a lot of environmental benefits, absolutely necessary during the drought, but nobody stops using water entirely. You still have to treat the water, deliver it through your pipe system. You still have to collect the wastewater, treat that. And so the bottom line there is fixed costs are very high, and we have to meet those fixed costs regardless of how much water is used.

Slide: Restructuring Revenues

This means we've had to move towards – we've had to move towards restructuring our revenues. We've adjusted the projections downward. One thing we've faced is trying to keep the rate increases as low as we possibly can but not overestimate our consumption. So this has been a challenge. We get everybody together here at the utility systems, planning, finance, and conservation and come up with our projection. But it's been an ongoing challenge here. We started out, back in fiscal year '11, 12 percent fixed revenues. We've since worked that up to 20 percent through adding additional fixed fee on the bill, which is actually volumetric. I don't have time to go into real deep detail on that. It's basically, on the residential side, the bottom one-third, lowest one-third of users pay one fee, the middle third pay a little bit higher, and the top third of users pay a higher one. We've also moved to drought surcharges. Those have not been implemented yet because they're in the deeper stages of the droughts – of the drought, and we're still talking about also major changes in the business model, even beyond what we've done already.

Slide: Moving to Augment Water Supply

And then we've moved to -- not necessarily new supplies. The council didn't really want to really move to new supplies, but we've moved to augment the supplies we have. I won't be able to go into a lot of detail here, but Decker Lake, if you look at this, here's Lake Travis, Lake Buchanan is upstream from there, Lake Austin. We have plants on Lake Austin. That's a steady level lake supplied by the other lakes. Lady Bird Lake, that's through town here. And then, so down below town is Decker Lake, which is used for a power plant for our municipal energy utility. They probably are likely going to be closing that plant or moving to where they don't need the lake as much. We supply them with reclaimed water. We're going to turn that – we have plants that turn that lake into an off-channel reservoir where we get water out of the Colorado after it rains. And it does rain more, like I said, down on that part of the Colorado than upstream from Austin. So we would scalp water off there and pump it up to Decker, and we would also fill the lake with reclaimed water. Then, when there's a call for water downstream, rather than releasing it out of the highland lakes, the drinking water supply, we would release out of Decker Lake, also called Lake Long. Another one – all these are going to be controversial with the different parts of our citizenry, but it's just really essential we move like this, we think. So another one is to fluctuate the level of Lake Austin, draw water out of there and not fill it back up with releases from Travis, take it about three to five feet down. And that

way – because we've seen in our -- when we have had rains, there's been rain over Lake Austin but not Lake Travis and Buchanan. So that's another one we're looking at. There are folks that live along that lake that don't like this idea, and we're going to have to work through that if we continue getting deeper into the drought. And we're taking steps towards that right now. And then, in the lake we have in town, we're considering, or we have plans to put treated effluent into there and then let that blend, and then put an up stream – right by the dam, on the upstream dam, take a – put a pipeline in there and take it up to one of our treatment plants. And so we would be doing indirect potable reuse. This is when our lakes get to about between 20 and 25 percent that we would put that in. These are the three biggest ones we have, augmentation strategies we have. There are some others, too.

Slide: Integrated Water Resources Plan

And getting close to wrapping up here, we're also doing an Integrated Water Resources Plan. One of the big questions there will be, should Austin continue to rely solely on the Colorado River? There are a lot of people in town that say yes, we should, but not everyone agrees. So that's something we're going to want to work out as part of this Integrated Water Resources Plan. Something else our city council is wanting us to do is to come up with real solid ways of comparing the cost of demand-side management and supply-side options so that they can determine which ones are most cost effective and most prudent for the city to be involved in. We're looking at about a one and a half to two-year effort. We're going to keep all these other things I've been talking about going on during – during that timeframe as we – because, obviously, we can't just sit around and wait for a year and a half to two years, so we're going to keep our drought response plan going – our augmentation strategies, we're going to continue moving forward on them.

Slide: Thank you

So that's about all I have. If anybody wants to get ahold of me, here's my e-mail and phone number. I'd love to hear from any of you. But I'm going to turn it back to Jim.

Slide: Webinar Logistics

Jim Horne:
Daryl, thank you very much. I appreciate – boy, you and Kathryn have thrown out a lot of information in a relatively short amount of time. Different scenarios but some really daunting issues. So we've got a little bit of time left, and I appreciate the patience of the audience, but two great presentations. What I'd like to do now is turn it over to Rob Greenwood and Morgan Hoenig, who have been tracking questions, hopefully, that have been coming in from the audience. So Rob and Morgan, go ahead and look over the questions and just farm those out as appropriate to whoever the speakers are. We'll try to get as many as we can in before we wrap up here today. So over to you.

Morgan Hoenig:
Thanks, Jim. And as you can see, we have an image here showing where you can submit your questions. We've already got a few, so Rob will start going down the list. And as you submit those questions, please make sure to indicate who they're for, you know, whether that's Jim or Daryl or Kathryn. So Rob, do you want to go ahead?

Rob Greenwood:
Yeah, great. Thanks, Morgan. So Kathryn and Daryl, for each of you, a question came in related to your reclaimed water effort. So Kathryn, I'll turn to you first and then, Daryl, over to you. But I'll tee up both questions since it may be useful for you both to speak to both of these questions. So Kathryn, to you, the question that came in was, "To what level/levels are you treating your reclaimed water, and are you using any of it for potable purposes?" And then, for Daryl, the question that came in for you around reclaimed water was just, "In what way is that helping to augment supply, and what are you seeing with respect to the economics of preparing that water and using it?" And again, what I'd say, Kathryn, is if you want to speak to both of those questions, and then, Daryl, if you could speak to both of those questions, I think that would be great. So Kathryn, why don't you go ahead, and then, Daryl, over to you.

Kathryn Sorensen:
Yeah, sure. So we're currently treating to Class B. It is not at a level that is appropriate for food crops or for direct potable reuse, though I do think that someday we will do that. I don't know if someday is ten years from now or 20 years from now or 30 years from now, but that's obviously something that we keep our eye on. And in fact, it would be relatively easy for Phoenix to reuse its reclaimed water directly. It's just a matter of if and when it becomes politically acceptable. We could very easily pump that reclaimed water back up into, for example, one of the SRP canal laterals which are already designated as waters of the US. So it would be – and then we could take the water back off the canal and into one of the treatment plants. So that would be a pretty simple thing for us to do. I imagine we'll just wait for the timing to be right regarding that. And then the second part of the question had to do with how this has benefitted our supply portfolio. Is that correct?

Rob Greenwood:
Yes, that's correct.

Kathryn Sorensen:
Okay. Right. So for us, what we prefer to do is use reclaimed water to fulfill needs that we think are important but less valuable than potable needs. So for example, our agreement with the Palo Verde Nuclear Power Plant, that goes back into the '70s, were it not for the availability of that reclaimed water, that plant probably wouldn't exist where it is or would have to use, you know, supplies that we would rather use for potable purposes. So it benefits our potable portfolio indirectly in that regard, but it's a very important advantage for us. The other, though, where we use it, I would say, more directly, is we deliver reclaimed water to a local irrigation district, and then, through a series of exchanges, through the Salt River Pima Maricopa Indian Community Water Rights Settlement of 1988, we then receive Salt and Verde River water in exchange that we can use directly in our potable system. So it's a way of taking reclaimed water and turning it into a potable supply through exchange. These arrangements have been tremendously valuable to us.

Daryl Slusher:
This is Daryl. We treat our – we have a Class A reclaim, but we do not use it for potable use. We use it to replace potable uses where it doesn't have to be potable, for instance, irrigation of golf courses, and we've moved beyond just golf courses to some commercial irrigation now. We use it in cooling towers. We have a gas powered power plant that Austin Energy, our city utility, we supply them. And I think there was also a question about the finances of it. We're moving to – we're, like, at about 35 percent of our portable rate right now. We're gradually

moving that up to 40 percent. But that is a real issue. For instance, the University of Texas, we're putting their cooling towers one by one onto reclaimed, and they're one of our biggest customers, so that's going to be a financial hit to the utility. But in the broader scheme of things, we think it's a good policy.

Rob Greenwood:
Great, Daryl, thank you. Kathryn, I'm going to head to you for a question. This one came up pretty early in your presentation. It was during your description of the pumping in and out of groundwater. So the question was, "What concerns/programs – what concerns do you have, and then programs, in response to groundwater quality?"

Kathryn Sorensen:
Right. So here in Arizona, we have to protect the aquifer through what's called an Aquifer Protection Permit, which precludes us from recharging anything that would impact the quality of the aquifer. So – and those are pretty strict limitations. So yeah, we're concerned about that, although – and we're very careful to make sure that the water meets those standards before we recharge it, though I would say that we are hopeful that one of our wells where we are currently recharging -- its recharging an area where we have some contamination with nitrates, and we're experimenting to see, if we recharge enough water, if we could dilute that water enough that it would be of an acceptable standard to pull back out. We don't know the answer yet. But I would say, in short, yeah, that's obviously extremely important for us to maintain the quality of the aquifer as well as the quantity.

Rob Greenwood:
Great. Thanks. And Daryl, we'll take one more question, and I'll go ahead and put that to you. A question came in, "Is Austin metering the recycled water and passing on the cost to water haulers?"

Daryl Slusher:
On the trucks? Yes, we are. We charge the same rate as others, yeah.

Rob Greenwood:
Got it. Okay, good. You know, Daryl, I'm going to do a quick follow-up then, given that that was a quick response. Another question that had come in for you is, "What tools does Austin use for supply and demand analysis?"

Daryl Slusher:
That's – well, we do the history of what we've used. We look at the various classes of customers. One thing we're going to be doing in the Integrated Water Resources Plan is disaggregation. We haven't done a lot of that to this point, so -- I don't know – I may be leaving out some, you know, financial terms or something, but that's basically what we do is have – look at the history of our use. We have predictions of what we think we're going to get from our water conversation programs, and we reevaluate that as we go along because we've been exceeding those, exceeding them as in saving more water than projected. And that's something that's been surprising to our financial side, so that's a little bit of a struggle we had in the early years of when we were strengthening our programs. But I think we're all on the same page now.

Rob Greenwood:
Daryl, thank you. So Kathryn and Daryl, just my thanks to both of you. Great presentations. Jim, we've got about two minutes for you to do a wrap-up before we close out.

Jim Horne:
Great. Thank you very much. We probably weren't able to get to all of the questions, but we'll try to farm those out to the presenters. Also, the presenters' information as well as my information, I think, are available on all of our slides, so feel free to contact us. This webinar is being recorded, and we will make the recorded version available through EPA's website, probably in the next two to three weeks. We'll also be sending out a Certificate of Completion for those folks who were able to stay on for the entire webinar. We don't provide specific CEUs, but we will indicate in there, you know, the length of the webinar, and hopefully people could use that if they need that for CEUs or other sort of educational purposes. But again, I just want to thank our two speakers, as well. I think you both told stories in addition to giving presentations. There was a lot to cover there, and I think you did it very efficiently in the amount of time we had. So I think this has been great. We look forward to our next webinar that my office will be sponsoring. That will be sometime in the spring. The topical area is still under discussion, but everybody that registered for the webinar today will be automatically invited to register for the next one, and we hope to get another really good turnout. So in wrapping up, I just want to say, on behalf of EPA, again, thanks very much to our speakers, and thanks to all of you for being on today's webinar. And with that, we conclude, and everyone have a nice rest of the week. Thank you so much. Okay. Thank you.

Daryl Slusher:
Thanks, Jim. Really appreciate it.

Jim Horne:
Surely.