After the Fact | Water, Water, Not Everywhere

Originally aired March 15, 2019

Total runtime: 00:15:50

TRANSCRIPT

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Dan LeDuc, host: From The Pew Charitable Trusts, I'm Dan LeDuc, and this is "After the Fact."

In 2016, the World Economic Forum defined the top global threat to society over the next decade. It's not war. It's not famine. It's not the next stock market crash.

It's water.

More specifically, the lack of accessible, usable fresh water. And with World Water Day on March 22, we're diving in to discuss how our planet's most abundant natural resource is in crisis.

The next time you turn on the faucet, remember our data point for this episode: 844 million. The World Health Organization says 844 million people do not have basic drinking water services. And around the globe, experts say we're using water faster than it's being replenished.

Sandra Postel founded and directs the Global Water Policy Project and is the author of *Replenish: The Virtuous Cycle of Water and Prosperity*. She joined us from Albuquerque.

Sandra Postel, welcome, and thanks for being here today.

Sandra Postel, director, Global Water Policy Project: Thanks so much. It's a pleasure.

Dan LeDuc: So we're talking about the amount of water the world is using. That's one thing. But we have to figure out a way to replenish it. You've called this the water cycle. We've all learned that in science class. And it's broken. What's happened?

Sandra Postel: Well, the water cycle is extremely important. We take it for granted. But it's the basic way that water moves across the landscape, gets stored in the landscape, and replenishes everything around us. And so when you think about rainfall coming down, well, what happens to it? Some of it naturally infiltrates into the soil and then

recharges the groundwater below. Some of it runs off into rivers and replenishes the flows of rivers and goes to the sea. And then some of it transpires and evaporates back to the atmosphere so the whole cycle can keep going.

And so the problem we see now is that the ways we've been using and managing and transforming the land—as well as the ways we've been managing and using water—have broken these parts of the water cycle. And so groundwater reservoirs beneath the earth are no longer getting replenished. We're depleting them. And rivers are blocked by dams, no longer reaching the sea. And soils no longer contain as much water as they once did because of the way we grow crops. And so, in these various ways, we've broken these very important relationships and broken the water cycle.

Dan LeDuc: So let's be specific. Paint a picture that a listener could see, like the Colorado River. I mean, it's irrigating the American West, but what's happening to that?

Sandra Postel: So we've built, over time, a lot of big dams on the Colorado River. This is the lifeline of the American Southwest. And Hoover Dam was the first big super dam in the world. Not just on the Colorado, but it showed us technologically we can build a super dam. And it blocks up a huge amount of the Colorado River, stores it in Lake Mead—which means that you're not getting that natural flow of the river.

We now have a large number of these big dams on the Colorado. And so the river doesn't really act like a river anymore. It is more like a plumbing system that engineers can turn on and off to meet the needs of farmers and cities. And it's really what has allowed cities like Phoenix and Tucson and Las Vegas and Los Angeles to grow and thrive.

And all of the agriculture that—where we get our fruits and vegetables in the wintertime—depends on managing this river. But it's come at a cost to the river. The last 90 miles of the Colorado River are in Mexico, the delta of the river. And that is completely dry now most of the time. It's very rare that you have any flow at all for the last 90 miles of the Colorado River.

So in the sense of the water cycle being broken, a big purpose of a river is to deliver sediment and nutrients and fresh water to the coastal zone, which is very important for fisheries. Well, that's not happening in the Colorado River. And also, the habitat for migratory birds in the delta—which is now all dried up and desiccated—that's gone. And so we've lost a lot of that natural function. We've lost a lot of habitat. We've lost that relationship between the river and the sea. So it's a great example of how we've had prosperity from the river but broken the water cycle in the process. So that long-term prosperity isn't guaranteed.

Dan LeDuc: That's a pretty important thing to think about. I mean, water is central to everything we do. And it's not just in our homes and what we drink and bathe in and cook with, but to manufacturing and to so much else in society. And of course, we're also lucky in that we can turn our taps on and get water. And there's a big chunk of the world for which—they still don't even get to do that.

Sandra Postel: That's right. It's very easy to take water for granted. Most of us listening to this, and on a daily basis, we turn on our tap and there it is. We don't have to think much about it. There are exceptions, even in the United States, with the quality and safety of water—as the residents in Flint, Michigan, have found out, and elsewhere.

But on the whole, we're very lucky. But for 800 million-plus people in the world, that's still not the case—where they don't have access to safe and reliable water supplies. Some women in Africa still walk many miles a day just to collect enough water for drinking and cooking and a little bit of bathing.

Dan LeDuc: And for many of us, where we do have access, the access is really thanks to a plumbing system. It's not necessarily because the fresh water is in great quantities where we are either, is it? I mean, the Colorado River, as we were discussing before, is probably a good example of that.

Sandra Postel: Right. Many large cities in the world now—the Western U.S. is a good example—but other cities around the world, too, really owe their water security to diverting water over great distances. If you look at major cities around the world and add it all up, cities are importing the equivalent of 10 Colorado rivers to meet their annual water needs.

That's a lot of water that's being taken out of nature and brought to urban environments to meet the city's needs. And again, that's a good tribute to engineering. That's a real success in some sense. We couldn't have cities in the desert without this massive plumbing works and the engineering works that go behind it.

Dan LeDuc: Well, let's talk about the groundwater, because it's so easy to visualize what's happening to a river like the Colorado or elsewhere that have been dammed up. We're seeing them diminished towards where they reach the sea. But groundwater is the water we can't see. Are we just assuming it's there? How do we know? I mean, our use of groundwater has increased dramatically as technology has increased. It allows us to pump and things like that, right?

Sandra Postel: That's right. Our use of groundwater in many ways has outpaced our understanding of the groundwater in aquifers beneath the earth. Most of the fresh water on Earth is in aquifers beneath the earth. Sometimes in very deep aquifers.

Sometimes in shallow aquifers. And as our technology has improved, starting back in, I would say, the 1930s and ’40s, with the technology to have a really powerful pump through diesel and electrification of the rural areas of the country and then the world, we’ve been able to pump a lot more groundwater out. And we’ve been doing that without knowing how much is really down there.

And so, as we've gotten a little better at estimating how much is there, and at estimating how much we're pumping, we’ve realized, “Oh my goodness.” There’s often less there than we thought. We’re pumping faster than nature is replenishing it. And we’ve gotten an understanding that we’re not in a very good situation.

That improved a lot with the launch of a satellite program called GRACE, which stands for gravity recovery and climate experiment, which was a NASA mission that put two satellites up in the sky to basically measure changes in gravity.

Because gravity is related to mass, you could then measure changes in how much water is in storage over time. And so, with that mission we began to understand this rate of depletion. And so, in places like the California Central Valley—very important fruit- and vegetable-growing area for the United States—the Colorado Basin, the Ogallala Aquifer, China, India, very important food-producing areas, we began to get a feel for this problem of depletion.

I consider groundwater depletion to be the sleeping tiger of our global water crisis, because it is out of sight, out of mind, and so important—especially to food security.

Dan LeDuc: So for a long time, it would be like me hitting my ATM every day and taking cash out without even knowing how much was in my savings account.

Sandra Postel: That’s exactly right. You can think of a groundwater account just like a bank account. If you take out more than you're putting in, you’re depleting your reserve over time. And that’s very much how we are with groundwater.

Dan LeDuc: And I’ve seen some statistics that—better than a third of the water that we’re using these days for food, drink, agriculture, or the rest, is coming from the ground. And as you said, that’s only been in the last 40, 50, 60 years when we’ve had the technology to use it. So, wow, as we’ve increased our use of water, the percentage that comes from the ground has increased almost exponentially than in recent times.

Sandra Postel: It has really taken off, yeah. And you go back to early irrigation civilizations—it was all dependent on river water. We just didn’t have the technology. Obviously, groundwater and rivers are connected, but in terms of how we thought about irrigating crops and so on, it all came from rivers and streams. But now we’re

pumping and pumping and pumping. And especially a country like India—which is the most dependent on groundwater—boy, the food security there really depends on coming to grips with the groundwater situation.

There's tremendous depletion going on in very important food-producing areas of India, important wheat- and rice-growing areas in the Punjab, Northwest India, for example. Kind of the breadbasket of India. And it's in a net depletion state with its groundwater. You know, the U.S., too. We have the Ogallala Aquifer, which is in the heartland of the United States, very important area for growing feed for cattle.

And much of that is in a very serious depletion state, where the groundwater is almost what we call fossil groundwater. It gets so little replenishment from rainfall today that it's more like an oil reserve than a water reserve. You know, where you pump it out and it's pretty much gone. You're just not replacing it on any time frame that's meaningful.

Dan LeDuc: Well, I guess the good news is, people are starting to pay attention to it. Right? We are starting to see some efforts around the world where water managers and others are starting to rethink. What are some of the innovative approaches you've seen?

Sandra Postel: One example that I think is instructive for much of the Western U.S. is what's going on in a river called the Verde River. It's a big tributary to the Colorado River itself. And like many rivers, especially in the Western U.S., much of the river, if not all of it, is diverted during the irrigation season to grow crops and to irrigate landscapes. And so that river was running dry for 4, 5, 6, 7, 8 miles at a time during that irrigation season.

Well, a partnership of conservation organizations—the Nature Conservancy, in this case—and irrigators realized that we could keep more water in that river if farmers had a way to better measure how much they're taking out. And so an automated head gate on the ditch system, solar powered—a little solar-powered device installed at the head gate—allowed them to take just the water they need and leave the rest for the river.

And that spurred a number of other innovations in the Verde Valley, where, including the switch away from water-intensive crops like hay to barley, and the production of a barley malt—a new facility to produce barley malt—to supply microbreweries and craft breweries in Arizona. Well, that's an economic benefit, as well as a benefit for the river.

And the head gates that I mentioned are giving the river twice the flow in the summer as before. And that's a triple win. You have a healthier river, which means more recreation and better tourism. You have healthier habitat for the fish, birds, and wildlife. And you have a modernized irrigation system for the farmers. It's smarter water management. Nobody loses in that. It's a great way of thinking about it, that we don't

have to think of this as an either/or, a zero sum. Smarter water management often produces multiple benefits. And it's a terrific way to think about it.

Dan LeDuc: So if you were writing this story and could craft the final chapter for us as a goal, what would you have in it?

Sandra Postel: I would have in it pulling out the stops on water conservation and water efficiency. We have been getting much better about that. If you look at our household water use, it's down a lot—about a fifth from where it was in the year 2000.

Well, that's progress. That's really good. And we have a ways to go. We can do more, especially outdoors. Irrigation is an area. I mentioned agriculture accounts for 70 percent of all the water we're using around the world. Well, there's so much we can do to save water in agriculture if we get the incentives right, work constructively with farmers. We can marry information technology into our irrigation systems and reduce the water that's needed to grow each crop.

We can install more drip irrigation and put sensors in those systems so that we know exactly what kind of additional water the crop needs and just give it what it needs and not give it more. So I would put conservation and efficiency way up there.

And then I would put these collaborative efforts that involve businesses and farmers and cities working together. Conservation groups who do the on-the-ground conservation work. These partnerships that show that we can put water back into nature. We can restore rivers. We can restore wetlands. We can restore groundwater. This is happening. And we can do more of it if we just scale it up. So I would put shrinking our human water footprint, restoring water to the natural world. Those are the two big areas of content for that last chapter of our water story.

Dan LeDuc: So let me ask: The glass of water is on the table. Is it half full or is it half empty?

Sandra Postel: Well, I'm an optimist, and so I would say it's half full. And we need to keep raising the level. And I think we can do this if we keep talking about it, spreading the word, spotlighting those really great examples of how we can repair the water cycle, how we can begin to fix this situation. I think we can start to see it spread out and scale up. And so I'll take the optimistic approach.

[Music fades in.]

Dan LeDuc: Sandra, thanks so much for this time today.

Sandra Postel: Thank you so much.

[Music continues, joined by sounds of rushing water]

Dan LeDuc: Sandra, who has been a Pew fellow in conservation and the environment, wrote about the broken water cycle—and how it can be fixed—in the latest issue of Pew's *Trend* magazine.

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Thanks for listening. For The Pew Charitable Trusts, I'm Dan LeDuc, and this is "After the Fact."