

21.04.03 The Waters Hour.wav

SM: Sarah McConnell

AS: Audio sample

KG: Kathy Gee

BH: Bill Hopkins

CP: Claire Payton

AC: Abbey Carrico

[00:00:00]

[music begins, continues in background]

SM Of all the things to remember about 2019, you might not remember it was one of the wettest years ever in the United States.

AS And this isn't the kind of gentle, standing floodwater that we see pictures of often in river flooding. This is water with the kind of power to do that. That's a dam. So this ... [speaking fades]

AS More weather issues out there. Every county in Oklahoma is under a state of emergency because of flooding. Evacuations are in effect along the Arkansas River with high water straining aging dams and levees.

SM Water traveled inland where it bullied levees and bridges and destroyed neighborhoods and livelihoods. As it turns out, we have a lot to do with what happens to rainwater from the time it hits the ground to the time we drink it. And our small efforts can add up over time to prevent catastrophe. From Virginia Humanities, this is With Good Reason. I'm Sarah McConnell. Today, how we can work with the water to keep it clean and keep ourselves alive.

[music continues].

SM Kathy Gee was canoeing along the James River with her father one summer afternoon when she was 11 when a rainstorm came through. That rainstorm changed the course of her life. Now, Kathy Gee is a professor of Earth Science at Longwood University and she studies rainwater management.

SM Kathy, you were on the James River with your father when you were a child in a boat floating before a huge rainstorm hit. Tell me what you experienced when you saw what happened afterward.

KG It's kind of seared into my memory. And so, yeah I was enjoying just a nice summer day with my dad in a canoe and, and we got caught in one of those summer thunderstorms and we had kind of pulled off to the side and, and once the thunderstorm had passed we, we had drifted back out into the river. And there was just this, this mass of sewage and just trash and, um, just the nastiest mess you could think of. Um, I remember just all of the cigarette butts I saw and the

stench was just horrendous. And what you may be aware of is that Richmond has a combined sewer system and so when, uh, the stormwater exceeds the capacity of the sewer, then, not only does the stormwater enter the river, but the sewer system overflows and enters the river as well. And that's exactly what happened and so we were sitting in the canoe, in the river when that happened, um, and so the stormwater from all the streets as well as the sewer, um, flowed into the river around us.

SM So before the summer rain, had the river been beautiful?

KG Oh, it was! It was, it was gorgeous. You know, nothing that you would think twice about just jumping in and, and paddling around without a boat. Um, and then you certainly would think twice afterwards. It basically smelled like somebody's toilet backed up into the river. And what you may be aware of is that Richmond has a combined sewer system. And so when the stormwater exceeds the capacity of the sewer, not only does the stormwater enter the river, but the sewer system overflows and enters the river as well.

SM It's amazing that at 11 or 12 you saw something we've all heard of, but we don't take very seriously because few of us see the before and after from stormwater runoff with pollution.

KG Exactly, um, and experiencing it firsthand would be a life altering event for many people.

SM Knowing what you know now, where do you think that stuff came from? I mean, was it, was it a small area, a few blocks? Wha-what do you think was going on?

KG Oh, this is the majority of the city and, um, knowing what I know now, n-I don't envy the people that have to make the decisions about this, um, that the city was built hundreds of years ago when they did the best they could. Um, the city was certainly not the size it is now and they don't have, they didn't have the knowledge, the expertise, the technology that, that we do now. And so Richmond is well aware of the problem of combined sewers and, um, you know, it is a very, very costly fix. But one thing that that can be done is, it's not as easy to decrease how much sewage goes into the system, but one thing that we do have the option of doing is try to decrease the amount of stormwater that goes into the system. That's one thing that I chose to focus on in my life. I chose the stormwater route and how do we make less stormwater in urban areas to try to, to decrease the, the volume of stormwater that goes into the rivers and the streams in this type of event.

SM Do you think there are a lot of U.S. cities that have this old fashioned, polluting system when the big rains come?

KG Um, it's not a high percentage, but it's probably more than we would like in, in a lot of them are along the East Coast, it's these older cities, you know, when we came to settle the country and we started urbanizing.

SM When you say it would be super expensive and hard to change, what would they have to do?

KG We're talking pipes that are, you know, running underneath the city 10, 15, 20 feet underground that we would have to somehow lay new pipe to, to a whole new separate system. Um, it would include installing pumps and different pipes to separate out that water. I think Richmond did a study on how much it would cost, and we're looking at, at millions, if not a billion dollars.

SM So when you say the other solution typically is just find ways to reduce the rainwater runoff after these big events, could that make a difference even in a large city like this?

KG Absolutely. Every little person doing their part adds up to a whole lot. And so it could be just as simple as putting in a rain barrel, but making sure you actually use your rain barrel, um, or putting in a rain garden.

SM What about inner city where it's just almost all pavement anyway? Is there anything you can do to mitigate this?

KG That one's a little bit tougher, um, and that may take more of a, a city level approach, but there are city level approaches that, that are occurring. Portland, for example, is doing a lot of green streets, um, and so there are Green Street projects where they go in and they add what we call bio retention, um, or rain, basically rain gardens that line the streets and they intercept that street runoff and allow it to filter through and slow down so that it's not going straight to the storm sewer right after the rain event. So, ideally, it's not contributing to those pipes when all of the other storms, uh, stormwater is. And so that's been really successful. We can put in what we call permeable pavement and this is pavement that allows water to soak through it and we can put that into parking lots or even on sidewalks.

SM That's a really interesting idea. Have you known industries and cities that are putting in permeable parking lots?

KG Absolutely! Um, and so, I'm, I work at Longwood University and here in Farmville, we actually have a permeable pavement parking lot. They work great. They're very effective, um, and they can help store that water and then release it slowly so that it doesn't, uh, go straight to the piping network right, right after a storm event.

SM Haven't we, for years, mandated that new housing developments and new business developments have, let's say, stormwater retention ponds? So we do that?

KG We do. We do. I'll even back up a little bit, like back in the, the 70s, um, we just put it in a pipe and piped it directly to a stream and, and our approach as engineers and site developers was to just get it off the site as, as quickly as possible and get it downstream. And then we, we started to see that that really didn't bode well for those downstream and, and so then we started holding it on site, but in these large detention or retention facilities. So we would hold it in these large ponds and then we would release it over, uh, maybe a two to five day period. That really didn't do as well either as we could have done. It didn't, what we call, mimic predevelopment hydrology. And so our ultimate goal ought to be to make it to where that water behaves the way it did before we ever got there. And those ponds were not doing that, um, they were warming

the water up. They were holding it and, and then releasing it at a really high rate, um, into the stream and that just wasn't natural. And so then, we started looking at things like rain gardens and we started looking at putting grass channels in instead of curving gutters, um, we started looking at disconnecting downspouts and letting water run across the grassed lawn instead of piping it from your downspout into the, the stormwater pipes. And we looked at basically redesigning neighborhoods to try to make that water behave in a way that was more like a natural environment, um, and this is what we call low impact development to, to try to make it have as little impact on that water as, as we can.

SM Is that doing better are you finding?

KG Absolutely. This is a much better approach, um, in terms of the environment, as what we used to do.

SM If people want to make their own rain gardens on their own properties, what would be your recipe for a rain garden and how big does it have to be? Or should it be?

KG So for a rain garden, um, our, our general rule of thumb is one square foot per one square foot of roof area. If you're going to have, maybe, a [one] hundred square feet of your roof draining to this area, then maybe a rain garden should be about a [one] hundred square feet and you just want to, um, you want to have it so that you have about six inches of ponding depth. So ponding depth means that water gets to pond into that particular area and it's going to pond up, but then it's going to infiltrate, too. The whole point is to collect that water and then allow it to soak into the ground also, and so know it's going to be a little bit wet and then it's going to dry out. And you don't want to pick the wettest spot in your yard. You want to get between where the water's coming from and where the water's going. So you want to kind of intercept it, so to speak. And so you want to dig out maybe probably about a foot and then scratch up the ground and, and rough it up a little bit, put some mulch in there and plant it with plants that like both wet and dry. So that if they get wet, it's no big deal, but then when they dry out, they're still happy as well.

SM Do you find that lots of people are doing this these days?

KG I do. I see them more and more and people are so happy with them. And they're just like little flower gardens, but they do so much more than just be a flower garden. They're actually mitigating stormwater and collecting stormwater and allowing it to soak into the ground.

SM It looks like rain gardens and permeable pavements and such, they're more expensive, right?

KG From a homeowner's perspective, you know, yes. If you want to go pave your driveway, it will cost you more to put in permeable pavement than, um, than a, a concrete or asphalt driveway. But it's actually been, um, people have done research from a developer's perspective, if they go in and, um, you know, they, they do a whole subdivision with these, what we call, low end, uh, en-low impact development practices, it's actually, um, comparable in terms of price.

SM That's interesting.

KG To do.

SM Yeah.

KG Yes. And if consumers start demanding this, or requesting, these types of practices, then they can drive the demand for a more stormwater friendly neighborhood or type of neighborhood.

SM That's really wonderful. Yeah, I think so few of us really think about stormwater, but you've opened my eyes.

KG Well, and, and it's important, um, you know, for, for so many reasons. I tell my students when I teach my class, um, on watershed management, I tell them if you, if you don't learn anything from this class, learn this and that's don't choose the house at the bottom of the subdivision. Because when you do that, you inherently learn about stormwater. You inherently learn that when the, the house uphill from you paves over their driveway or puts an addition on that an increase in the amount of what we call impervious surface, and that's the, you know, the surface that doesn't let water through, is going to cause more runoff on you downhill. Thinking about this ahead of time can certainly cause you less headache in the future.

SM And to the person at the top of the hill, make a rain garden.

KG Make a rain garden or use permeable pavement.

SM That's wonderful. Kathy. Gee, thank you for talking with me on With Good Reason.

KG Thank you for having me.

SM Kathy Gee is a professor of Earth Science at Longwood University.

[00:13:25]

SM Along Appalachian streams, people grew up watching hellbenders swim around and fight under the water surface. Now, their grandchildren have hardly ever seen those two foot long salamanders, also affectionately called "snot dogs". Bill Hopkins is a professor of Wildlife at Virginia Tech. He sometimes sits along the same bridge where an old timer tells him he once saw those Hellbenders 30 years ago. He's trying to understand what's happening to the nearly extinct population and what the Hellbender disappearance says about our waters. Bill, you have been researching a fascinating creature called the Hellbender. It has a lot of other colorful names, but it's basically a two foot long salamander that lives in the bottoms of beautiful streams in Appalachia. What have you come to love and understand about the Hellbender?

BH Well, Hellbenders are sort of an icon, if you will, in Appalachia. I mean, we have incredibly diverse species of salamanders here across southern and central Appalachia but Hellbenders

are sort of like the regional icon. There's nothing else like it that occurs in North America and, you know, I think I've just become passionate about this animal. They're incredibly interesting in terms of their biology. Uh, the dads actually care for their young for, for months after the eggs are laid. Uh, so there's many things about their biology that's very unusual and very different than a lot of other, uh, salamander species.

SM What do they look like and where do you find them?

BH [chuckles] They, uh, they look --

SM [chuckles briefly].

BH Sort of like this very strange, large, brown, sort of mottled coloring, uh, and slimy creature that, quite frankly, when I pull one out of a stream and, you know, there's people standing around, you know, their mouth just opens and they gasp because they can't believe that in this little stream there's these giant salamanders that look, uh, prehistoric and they look prehistoric because they are. We believe that they, from the fossil record, we think that they probably split off from some ancestors around 70 million years ago and so that means that this species, or something very, very similar to it, uh, occurred at the same time as the dinosaurs. So they co-occurred with the dinosaurs, but when the dinosaurs vanished, uh, and went extinct about 66 million years ago, Hellbenders, they were resilient. They made it and they, they hung on and, and they're here today.

SM I remember reading years ago about the Lewis and Clark mission, fishing and pulling out maybe 60 fish every few minutes from the, the teeming lakes and rivers. Do you think Appalachian streams once teemed with Hellbenders?

BH I do. I do. I think that before we started to log and pollute, uh, our Appalachian streams, uh, and before we started to introduce species like trout, for example, I think that they were probably extraordinarily abundant. And, you know, when I speak with local landowners, people that have spent generations, um, living on the land along some of these Appalachian streams, you know, they tell me that when they were kids, 50, 70 years ago, that they could sit by the stream and see dozens of Hellbenders just swimming around, uh, and that's something that you definitely don't see anymore. So, I think at one point in history, they were very, very common. There's this, uh, one fisherman that I've talked to on numerous occasions that has told me stories over and over again about how he used to sit on this bridge; it's a bridge that's still there and we still work in this area right around this bridge. And he says that when he was a kid, he would sit up there and watch hellbenders swimming around. He said he could see them fighting. He said there'd be different colors, that you could see brown ones and orange-ish colored ones and pale colored ones, and that that was just common and that they would catch them all the time when they were fishing. And the same gentleman has told me repeatedly, uh, that it'd been 20 to 30 years since he had seen one until he would come see us at the Stream Bank. And now he stops by on occasion just to see one because he gets excited and I think it brings back memories of his childhood. When I travel to other places in the world, like the Amazon rainforest, and I meet with scientists and professors that work in those systems, they're in awe

that I live and work in Appalachia. They don't want to talk about what's in their backyard, they want to talk about what's in my backyard. So, you know, I, I think we have this treasure here that stretches from north Georgia all the way up into New York and is really a phenomenal place that we need to protect.

SM Do you have any underwater cameras on those egg nests that the father hellbenders watch over?

BH [chuckles softly] We are peeking in the nest these days with cameras, trying to understand exactly what the dad's doing. You know, what is he doing to try to take care of those, uh, babies? And so that's something we're just now starting to scratch the surface on, um, but it's pretty exciting because up until now, no one has studied the parental care in the species and it turns out, you know, that we know that they fan the eggs and, of course, protect the eggs from predators.

SM So do you think that Hellbenders' numbers were drastically reduced by people just gigging them and killing 'em and catching 'em?

BH I think that's [exhales] probably part of it, you know, I think with a lot of declining species, there can be multiple causes for declines. And I think that persecution is part of that. Um, we know, um, that fishermen historically would catch them and, you know, in some cases just not knowing what to do with them, kill them and throw them up on the bank. And we know that it still occurs because we'll find them sometimes that way with hooks, you know, hanging out of their mouth and s-and stuff.

SM What sort of other factors are reducing the population in Hellbenders, do you believe?

BH Well, that's a great question [exhales] and that is exactly what we're trying to find out. Um, we're trying to figure out what could be coming off the land that might pollute the streams or affect the habitat in the streams. The one thing, the one commonality that we find here in Virginia, and others have found in other states, is that when you cut down the forests and you convert that into parking lots or into, uh, farmland or, or neighborhoods, when you cut down the forests, you increase all the siltation, all the fine sediments, the mud, the runoff that ends up in the streams. And we think that something about that is what's either causing this reproductive failure or causing, uh, the baby hellbenders to not survive.

SM And why do we see the hellbenders as the, as the canaries in the mine shaft? Right? Other than we all hate to lose another ancient species, why else do we care?

BH Well, [exhales] I'll tell you what keeps me up at night. You know, we're looking at a species that co-existed with the dinosaurs. It lived through this mass extinction event that occurred, you know, millions of years ago, some 66 million years ago, but now, due to something that we as humans are doing on the landscape, now, we know that they are declining and they're declining fast; we think that about 80 percent of hellbender populations have vanished. And so what I worry about is [exhales] that there's something that we're doing on the land, that we're doing on a global scale, and, you know, we see it here just as a microcosm in Appalachia, but perhaps

we're doing things with unintended consequences, uh, that are really devastating and we just haven't quite figured out what that is yet.

SM Do you think the problem is primarily runoff from farms or cattle and livestock in streams? Or toxins coming from mining and industry?

BH I think the problem for hellbenders at this point is probably more I mean, it could be all of those. We can't eliminate any of them. But I think, at least in the region where I'm working on, on hellbenders, I think the bigger problem is related to clearing the land for livestock. These are often times low intensity farming operations, you know, they're not like huge crop agriculture, it tends to be small, family owned farms that are sort of, you know, right next to each other. And, uh, cutting down all the trees next to these streams to accommodate the livestock is really problematic. When you do that, you destabilize the soils and you end up with all sorts of particulates that wash into the streams and you end up with cattle in the streams, too. So the cattle destroy the banks when they're standing in the stream, of course, they poop and pee in the [chuckles] streams and that, uh, has all sorts of repercussions for fish and wildlife, as well as humans.

SM In addition to harming hellbenders in freshwater streams, what are the other harms that we're causing when we allow farm runoff animals and industry to degrade streams?

BH Oh, I would say that, you know, hellbenders are just one example, right? I mean, it's affecting almost all animals, plants and animals in these streams and it also affects humans. And so, you know, when you think about some of the subtle effects, I'll just give you one sort of astonishing example. We now know that antibiotics, which are used a lot in agriculture for livestock, antibiotics can result in antibiotic resistant genes that are basically released into streams, lakes, reservoirs, and these can end up actually promoting antibiotic resistant infections, uh, not just in wildlife, but also in humans. And so this is one of these emerging areas, these invisible threats, that we weren't even aware of decades ago, uh, but now we know are common problems and only getting worse.

SM I've heard some of these hormones are creating fundamental changes in species and streams also.

BH Yes, that's true. So, we can see a variety of hormones or-that are used in agriculture, but also things that mimic hormones. There's a lot of pesticides, for example, that actually, uh, act as mimics of hormones when they enter an animal's body. And these things can actually cause males to become feminized, females to become masculinized can actually cause changes in behavior, can result in changes in fertility, uh, and of course, you know, I'm talking about this from a wildlife perspective, but everything I'm talking about also applies to humans.

SM Can you paint a picture for me of some of the parallels of the, the effect on humans and the effect on animals, even these tiny species? So, fish, let's say, getting fewer nutrients and becoming weaker. Are those indicators of health consequence also occurring to us?

BH Yeah, I think a, a pretty straightforward example is, you know, we know, for example, that sperm counts in men, uh, have dropped in certain, uh, regions of the world, like certain parts of Europe, and it's believed that some of these are related to, um, some of the pollutants that we've talked about, um, also potentially related to hormone imbalances. These same sorts of things are what we study and wildlife to try to understand why populations of wildlife are declining, uh, and so, you know, we share very similar physiologies to, um, the wildlife that, that we care about.

SM As you're doing your research on hellbenders or freshwater turtles and such, do you think sometimes about what you'd like to see us all do that might reverse some of the consequences?

BH Yeah, I do. You know, it's sort of alarming to me that you can't go anywhere on this planet and not see the footprint of human society. You know, you can go to the most remote places, Antarctica, tropical rainforests in the Amazon. And our footprint is clear. You know, there's plastics washed up on, on the seashore, um, there's invasive species in places as far away as Antarctica and, I, what I really want is for people to understand just how connected we are, how society and the environment are so intimately connected. When we put our mind to it, you know, when we try to adj-address huge environmental challenges, we can make changes and we can actually-actually, in many cases, actually reverse some of these, you know, incredibly, uh, the, in bald eagle case. Terrible problem, right? That was actually my, incidentally, that was my first job, to basically travel around the state of Georgia and find all the bald eagle nests, and when I say all the bald eagle nests, at that time, there were only 12. But the decade prior to that, there were none. And so they were making a comeback and they were making a comeback because we had enacted legislation to ban organochlorine pesticides. We had enacted endangered species protections for the first time. And so through the work of thousands of people, we made drastic changes that actually brought the eagle as well as other animals like the peregrine falcon back from the brink of extinction. So we can do it. It's just a matter of are we willing?

SM Bill Hopkins, thank you for sharing your insights with me on With Good Reason.

BH Sarah, thank you for having me. It's been my pleasure.

SM Bill Hopkins is a professor of Wildlife at Virginia Tech in the College of Natural Resources and Environment. He was named a 2021 outstanding faculty member by the State Council of Higher Education for Virginia.

SM This is With Good Reason. We'll be right back.

[00:28:06]

SM Welcome back, this is With Good Reason from Virginia Humanities.

SM Water is at the center of social and political inequality all over the world, and that's especially evident in Port au Prince, Haiti. Claire Payton's a visiting scholar at the Carter G. Woodson Institute for African-American and African Studies at the University of Virginia. She says in Port au Prince, rainstorms are a regular disaster, with storm water rolling down hill

making swamps of whole communities. Claire, over a period of about 10 years you've lived in Haiti on and off as you've pursued your degrees. What did you notice about rainstorms, which are so common there?

CP Um, I was really struck by the way that, what, what might seem like ordinary climactic events, you know, just like a big storm, could just torture the city over the course of, you know, a couple of days or weeks. So, it's like for six months of the year, it rains almost constantly or at least every day and then for six months it's, it's fairly dry. But during those six months of the rainy season, water kind of determines where you can go, when you can go there, if you can go there. The crisis of flooding in, in Haiti, I think is related to two factors. One is, is deforestation. There's nothing, like none of the sort of layer of vegetation and environment that holds topsoil into place, when that's all gone, the earth is just a slick surface. Either it's rocks or it's cement and water just pours downhill. So deforestation is the first issue and the second issue is, is Haiti's extremely mountainous. Uh, the word Haiti, uh, in, in the indigenous language is Ay-ti, which means mountainous land, like it's just part of the country's character. So these twin sort of environmental or geographic features combine to be, to be quite deadly for people living in settlements, which are usually at low lying areas. So they're surrounded by basically an amphitheater that's a slick surface where like where the seasonal rains just pour down like a bowl.

SM So normal rainfall, or heavy normal rainfall, is often causing misery for people who live below the mountain?

CP Yeah, yeah, very much so. While I think a couple decades ago, there was a r- a fairly clear correlation between like environmental catastrophes, like, caused by human behavior on the mountain, suffered by people down below. I should say that was a very class, you know, relationship with like lower income people living in the most flood prone areas and higher income people generally living on the mountain.

SM Couldn't everybody move higher up? Could not rich and poor also seek elevation for their homes?

CP Elevation is expensive, like the safety that elevation provides is part of what makes those land values really high.

SM Is the water problem contributing to a problem with safe drinking water?

CP Well, yeah, definitely. They're, they're interrelated in a lot of ways. For one thing, when the city sort of takes over the environment and stops this ecological cycle of water getting absorbed into the aquifer, there's less drinking water to go around. So that's problem number one. And then, instead of becoming drinking water, rainwater pulses down through the city and becomes dangerous runoff, which can become floodwater in, in, in, you know, the worst circumstances, and all of that floodwater washes down trash, washes down, you know, human waste, washes down all the stuff that's just on the ground and all of that gets pushed downhill. And then part of the floodwater problem is that the trash and debris and eroded rocks and whatever, there are

some like canals for, for draining floodwater from the city, but they become backed up by, uh, physical materials that get pushed down by these floodwaters.

SM How does a place that rains and floods more than half a year also have water scarcity for so much of the population?

CP Well, it's less scarce than monopolized. There's a lot of water, and yet it's almost all consumed by a very small portion of the population who have, you know, maneuvered their way to living right next to where water comes out from so that they get to use it all before, or get to use as much as they want, and then whatever they don't use kind of makes its way downhill towards people, uh, in lower elevation areas. So then what ends up happening is city water authorities start reaching the hand of the city into nearby agricultural areas and taking their water to feed the urban population. And all of that kind of happens in this very sanitary, technical language that ignores how unevenly distributed water consumption is among different social groups.

SM What do you mean that people congregate around the freshwater and use it all for themselves? Give me an example.

CP Well, like the, in, in Port au Prince, one of the main sort of enclaves for elites is called Pétion Ville and the reason that Pétion Ville exists where it exists, why it was historically founded, was because of, it was right next to these, these freshwater springs that bubbled out of, out of the mountain. And part of the appeal of, you know, moving up their spending time up there was that you had unfettered access to water. Wealthy households would go and set up vacation homes and then eventually, once a car was invented, then they lived up there all the time and just drove down town and downhill to the main area. And there's actually some lovely quotes, uh, from the 19th century that I found where people were residents there are writing about how their neighborhood is this happy circle, this happy, our happy circle of the city of water. And you can really see the way that, like elite lifestyle and access to water go hand in hand.

SM For the people that don't have that proximity, how do they come by their drinking water?

CP It's a completely privatized system. So, folks without water often buy water by the gallon, which is like a big five gallon bucket, by the you know, by the sachet, which is like a little handheld water plastic bag that's like one serving. If they have a house and that house has a, a sister and they get a tanker truck to come up and fill it, you know, a thousand gallons at a time. But all of that is people without access to public services, often paying money to people with public services. So a lot of the water distribution happens from folks who the city does provide water to, and then they sell it to people without at an enormous markup. You know, folks in the lowest income groups could spend a full 20 percent of their income trying to get the basic amount of water to drink, clean their homes, you know, wash their clothes, bathe. Imagine spending 20 percent of, you know, we, in the America we talk about, like 30 percent of your income going to rent makes you house poor? This isn't even talking about rent. This is just talking about like the most fundamental substance to life and and public health {chuckles} 20 percent of your income.

SM When you have looked at the misery caused by the lack of good water systems and environmental practices in Haiti, you often see similar situations on a smaller scale throughout the United States; that it's not just Haiti and poor nations suffering this way.

CP No, and I think that's one of the big, uh, sort of flexes of wealthy countries, is to, is to make it look like these infrastructure crises are, are elsewhere. You can just look around in the United States.; New Orleans is obviously a huge one, Flint, Michigan, Houston, all of these cities where inadequacies in the water infrastructure or the infrastructures of water control, be it drinking water or flood water, have failed their populations. But there is somehow this trick where those crises don't become representative of American culture and politics and public governance as a whole. Whereas when we see crises and failures of infrastructure in places like Haiti, that then becomes characteristic of their whole life experience and their whole approach to governance.

SM Over the period that you spent in Haiti on and off, did you love your time there?

CP Um, yeah! I loved Port-Au-Prince. I really liked driving around on motorcycles a lot. That's one of the best ways to get around town. I don't really walk around very much, um, but yeah, you would, you know, you eat street food, you go to some great restaurants. It was a, it's a very lively, lively place.

SM Did you ever notice the craziness of the rain situation yourself?

CP Oh, yes. A friend of ours was preparing a special dinner way up in the mountain like, uh, so very, very far up hill. Started driving, it was a horrible rainstorm. The entire road was completely flooded. There was terrible traffic because the, uh, rainstorm had caused this enormous landslide. So I think we ended up getting there around nine o'clock. It was kind of scary at certain moments and later I looked it up and it turned out that was actually historic rainfall. There were several deaths in the city that night. Rain and flooding was so normalized that we didn't really realize how dangerous what we were doing was.

SM Could you tell from your own living experience that a lot of people who didn't have means had a harder time with the water issues?

CP Oh, yeah. Folks who, who, who can't afford this astronomical private water market and up, you know, drinking water where they can find it and sometimes those aren't clean sources and so during the 2010, 2011 cholera epidemic, people not having access to clean water was a huge issue but it, but it's also a class issue because folks who, who can't afford clean water are the ones who are, who are most likely to fall ill. And, you know, rich folks, I, I, I, when I was living there, I lived there during the cholera epidemic when it happened and I just knew that my wh-like, I, I didn't have to worry. Like, I worried, of course but like, I also knew that I had access to potable water and clean water.

SM What made you think about looking at water and the deprivation for poor people in Haiti?

CP Well, once you start, once you live in Haiti and had these experiences of trying to cross flooded roads and, you know, going downtown and realizing that, like you, you can't and no one

else can because this major intersection is two feet deep full of like trash filled water. You sort of, you just see the way that this environmental cycle impacts completely ordinary exchanges all the time.

SM Right.

CP The absence of adequate infrastructure around drinking water and storm water in Haiti is not the exception. All of these things that we think that are invisible happen because our governments had a bunch of money to invest in enormous infrastructure projects that now we enjoy through the time that we get to spend not worrying about whether or not our water is clean, not worrying about whether or not our, you know, sewage is, is, is washed away from us. Think of all the time that you would not have if you had to go draw your water by the bucket like every single day. You had to physically go somewhere with like a 10 gallon bucket and carry it back and then use that to drink, to wash, to bathe or like spend your money, you know, to people who just circulate on foot through the city with buckets of water on their heads, selling it by the ladle full, even sometimes. So many people are forced to spend their emotional energy, their physical energy, their money, just getting their basic needs met, just, you know, getting to work and back, just getting the water they need to keep their body alive another day. And then folks who don't have to worry about that, look at them and say what's wrong with you? And it's just outrageous. And in an ideal world, everyone would enjoy the ease that modern infrastructure in major functioning US cities offers. It takes so much money and work to keep all of this going and, and the environmental crises in the United States are starting to show that even in these places like New York, like Houston, like major US cities aren't able to keep it together for that much longer.

SM Claire Payton is a visiting scholar at the Carter G. Woodson Institute for African-American and African Studies at the University of Virginia.

[00:41:23]

SM Water is everywhere. In literature, too. From children's books to the novels that shape our perception of love; water is everywhere. Abbey Carrico is a professor of literature at Virginia Military Institute. She's teaching a course on water in French literature.

AC Well, we read a variety of texts,. Um, I think it's important to give them a variety of different genres and literary movements to see how the theme of water in French literature during the 19th century went beyond just one genre or one type of literary movement. So we read things from the romantic period up through naturalism at the end of the century. Um, one of the texts we started with was a novel called Lelia, and this scene just jumped out at me as one that tells the story of how water interacts with the human body. So, in this scene, there's this character that is drowned and there's another character that comes and discovers the body, but at first doesn't know that this body is dead, that he's drowned and he just seems to be sleeping, lying there. And there's insects around and it's sort of this beautiful scene, romanticized, idealized. But then as we read closer and we look more at the language, we see that the insects are drinking from this decomposing body. And we see the hand is almost melting into the water.

And so there's this, um, questioning between life and death. And so in this text, students are really able to see, um, how water can be a site of death, but also of life.

SM You also look at the writings of Gustave Flaubert. Tell me about Flaubert and how Flaubert looks at drowning death.

AC Yes. So in Gustave Flaubert's, one of his early works, which was written in 1838 called "Le Memoires D'un Fou", there's this very powerful, very short, but powerful scene, it's actually a nightmare of the narrator of the book. His mother drowns and he is stuck to the ground, impotent, can't do anything to save her. We have her crying out for help. But then all we hear is the water rushing by in this river where she's drowned. And then later he falls in love with a woman, sort of an older, married woman, and he falls in love with her next to the ocean. Um, there's this very beautiful scene in which she's-he's watching her bathing in the ocean. But you can't really tell is it her body or is it the waves? The foam of the waves, and there's again, just like we saw in, um, the text by George Sand, we have this inseparable nature, I suppose, between the human body and water.

SM There's another French author who writes a little later in the 19th century about spas.

AC Yes, his name is Guy de Maupassant and one of his very interesting novels is called Mont-Oriol and it's written in the 1880s and it's about this spa town where these tired, sickly city dwellers, they go to the French countryside and they get to be healed by the natural springs. At first glance, it seems this wonderful experience where you can go and receive medical treatment and relaxation and be away from the busy city, which by that time had been very, um, you know, was part of the industrial revolution and so the city was dirty and there were hygiene issues. And so you could go to this beautiful spa but Maupassant is always very subversive in his writings and presents, on one hand, this idea of healing, the caverns, and the natural springs, and the temperatures of the water. But then you have these characters that are using it and manipulating these natural resources for money, for capitalism, for, um, creating actually sort of replicating, um, some of the city life. They have casinos and these wonderful meals together and they dress up and so it's this very interesting play on, um, city versus country life and the artificial versus the natural. And it really reveals, to me, it reveals a struggle that writers were trying to portray in representing the, the social, political, economic conditions of the time where, at the end of this century, so much had so quickly changed with, um, human relationships, with nature and with industry taking off.

SM Did any of these writers, these French writers in the 19th century, did any of their work spark change in policy or behavior?

AC Mmm. There, there were environmental activists at that time and writers and other, um, artists who spoke out against industrialization and the, the terrible effects this could have on the land. Emile Zola, he was a journalist and a writer and a, and an activist. In one of his short stories called "L'Inondation", which means, um, "the flood", he based this story on an actual flood of the Garonne River in 1875, which was just absolutely devastating. He created this fictional account of it all about one family and the story goes step by step, hour by hour, even

minute by minute a-alongside the rising floodwaters. And it's this whole, very tragic tale told from the narrator, who is the patriarch of the family. The flood comes and his whole family, they go up to the roof of his house, which he's been adding on stories to house all of his family as it grows, and everyone drowns except for him. But the curious thing about this is, rather than reinforcing this very 19th century idea of man versus nature and this war language and the water battling the humans, very curiously at the end, he says that all he wants left in life is to be buried in his family plot, which, of course, is next to this river on his farm where he grew up and where he built his whole life.

SM What about you? Do you have personal connections to water that may have been in the back of your mind when you became interested in looking at French literature through water images?

AC I did not really realize that my own personal experiences were, were infused in this passion that I have, um, for these-this water and literature. I grew up going to my grandparents house every summer on the Potomac River, and when I was studying abroad in France, I lived in a city on the Atlantic coast called La Rochelle. I did, I remember eating oysters Ile de Re, this little island out on the coast. And so I think from my own life, I've had these, these personal interactions with water. Um, the other day I came across a poem that I had written when I was 13 called "Ode to Water". And so.

SM [chuckles]

AC Yeah

SM Oh, that's wonderful. Do you find that students are more engaged this way, looking through the lens of water?

AC Mhm. Because almost everyone has had a personal experience with water in a variety of ways. So students look at issues that we have today and think, wow, these were the same issues. And I did have one student who after graduating, became a vegan and now is super interested in the environment and told me that in part, he had been inspired by the class and realizing that environmental concerns are not new. And when we looked at these texts, even if it was something more like drowning, which is more human centered, you know, that's not looking specifically at the environment, but but looking at these stories that were told about the human condition and about humans in their place and in their space and say and and seeing these interactions and maybe even being inspired by the romantic period in which nature was seen as beautiful and having that that appreciation for it, perhaps that's where he was inspired.

SM Do you find that more and more universities are doing courses like this, where they're infusing humanities with the environmental perspective?

AC Yes, yes! There are, at some universities, there are environmental humanity divisions and programs, and there are French scholars or literature scholars from different departments, maybe English, maybe philosophy. It's a very interdisciplinary, cross disciplinary move because

something like the environment obviously has a role in the sciences, but also it's something that connects us all. And I think that these programs do help students see that.

SM Well, Abbey Carrico, thank you for talking with me on With Good Reason.

AC Thank you.

[music plays in the background]

[00:51:01]

SM Abbey Carrico is a professor of Literature at Virginia Military Institute. Support for With Good Reason is provided by the University of Virginia Health System, pioneering treatments to save lives and preserve brain function for stroke patients. UVAHealth.com. With Good Reason is produced by Virginia Humanities, which acknowledges the Monacan nation, the original people of the land and waters of our home in Charlottesville, Virginia. Our production team is Alison Quantz, Matt Darrough, Lauren Francis and Jamal Millner. Maya Nir, Cassandra Deering, and Dontae Woodfolk are our interns. For the podcast go to WithGoodReasonRadio.org. I'm Sarah McConnell. Thanks for listening.

[music fades]