Welcome to this week's installment of Grace's Our Heroes Podcast series. I'm Robin Madel and I'm talking with Water Educator, Matt Malina, founder of NYC H2O, an organization that offers educational programs to New York City residents about our city's incredible water system.

Hi Matt!

Hi, Robin, thanks for having me.

You're welcome. Welcome to the show.

Q: So tell me about NYC H2O, how did it get started and what do you do?

NYC H2O, as you said, is a series of educational programs about New York City's incredible water system. It started back in 2008 when I met Damian Griffin, who is the education director at the Bronx River Alliance, a terrific organization that helps to clean up the Bronx River as well as education and ecology awareness about that river.

When I met Damian, I had told him that I had been trying to set up a tour of one of New York City's sewage treatment plants, because I was interested in it and I wanted to bring a group of teachers to see it. And I explained to him that the agency in the city - the DEP [Department of Environmental Protection] - that runs our drinking water as well as our sewage system, was no longer giving tours because it was considered a safety threat after 9/11.

Damian said that he had a contact up at the Yonkers sewage treatment plant, and he put me in touch, and I gave my first tour of a sewage plant back in 2008. And it was on that tour that I met a woman, Lisa Breslof that worked at the American Museum of Natural History, and she had her friend that had written a book about the water system. So the next event was a lecture about the history of New York's water system and it was given by Diane Galusha who wrote the book called **Liquid Assets.** And then at that lecture I met some other people, namely Gina Pollara, who, back in December, gave a talk about a book that she had been an editor on called **Water-Works**, also about building the water system.

Q: Right and that was the talk where I met you.

Right, exactly.

Q: What are some of the trips that you've taken? I know that you've also organized tours to go out into nature.

Yes. There are two coming up that I'm pretty excited about. One is a bike tour of the Bronx River. That will be offered in partnership with the Bronx River Alliance, and

Damian will be leading that tour. We'll start at the mouth of the river, that's the bottom - the Bronx River empties into the Long Island Sound. We'll start at Sound View Park, which is right there on Long Island Sound where the Bronx River feeds into it. And we'll bike up along the river all the way to Valhalla, which is in Westchester, where the river begins. And also in Valhalla is the Kensico Reservoir, which is the main settling reservoir for New York City's drinking water.

Q: How much of an elevation gain is that?

That's a good question. I'm not sure. It's probably – if I had to guess, between 100 and 200 feet, but that's a complete random guess.

Q: And I looked it up. I think it's about 22 miles, something like that – 25 miles?

That's right. The bike tour is.

Q: Oh that will be fun.

Yes, that's April 23 – a Saturday. And May 8th, which is a Sunday, the following two weeks, will be a stream ecology hike up at the Rondout Reservoir and that will be with Mark Vian, who is a stream ecologist with the DEP that works up there. And what's interesting about that is streams and rivers feed into our reservoirs; we have several reservoirs upstate in the Catskills and it's important to monitor those streams so that they don't wash too much sediment into the reservoirs. And so a stream ecologist's job is to make sure that the stream is not eroding too much, that it's following a natural pathway and, if the right vegetation is there, that prevents erosion.

Q: He'll talk about all of this during the talk?

During the hike, and we're going to hike along a stream where he shows us all of this.

Q: I know you've taken other trips in the past; you did a bike trip?

That's right. We had a bike tour of the Old Brooklyn Waterworks; in fact we did two, because the first one was so well received. And it went from Long Island where the reservoirs are for--at the time, the city of Brooklyn. The reservoirs used to reach all the way out to Long Island. And then it was brought via pipes and water had to be pumped. Because Long Island is mostly flat, it would be pumped to the Ridgewood Reservoir, which is the main distributing reservoir for the city of Brooklyn. That reservoir is still there; it has been drained, but the basins are still there, and now they are de facto nature preserves.

Q: Didn't Brooklyn used to have its own water system and then eventually they joined New York City's?

Indeed, because Brooklyn used to be the fourth largest city in the United States. And as a result, they had their own water system. It wasn't as good or as pure as New York's water system, which, starting in the 1830s, came from the Croton Reservoir and the Croton River. But still it was good quality, because it was coming from reservoirs that were further out on Long Island.

Q: Most people turn on their tap and they take for granted that the water is just going to come out. But it seems like for you it's so much more than that.

Yeah, there is an incredible history to New York's water. Back when the city started in the 1600s, people used to collect their water from wells. And there was a reservoir, or a lake, called the Collect Pond and that was down, not too far from Court Street, and it's kind of neat. You could see it on the old maps of the city. Like at the Brooklyn Museum, now they have an old map from the 1770s on display called the Ratzer Map. This guy Ratzer was a colonel, or some officer in the British Navy or Army, and he created this map of New York because at that point New York was already part of the British Empire. And you can see the Collect Pond – it's there. Anyway, so people used to get their water from ponds and streams.

But as the city became more populated there were animals running in the street, people would throw their trash into the ponds and the streams and it became polluted. Eventually there were typhoid epidemics, cholera epidemics, and there were fires, and no way to extinguish the fires. I think in the 1830s there was a fire that burned several hundred buildings. So anyway it was time, by the 1830s, to build a water system. And there is a very rich history to it and a very interesting story. So once the system got built, it was a tremendous engineering feat, because when the idea was brought forth to tap into the Croton System, that was 35 miles north of the city. And so first they had to build the reservoir and the damn for the Croton Reservoir, and then they had to build the old Croton aqueduct, which brought the water 35 miles into the city. That was a tremendous undertaking because there weren't machine tools and everything was done by hand and with animals, with picks and shovels. And the old Croton Aqueduct is still around. You can actually go inside it in several places. And there's a wonderful organization called the Friends of the Old Croton Aqueduct who have a website and periodically they offer tours into the aqueduct up at Ossining.

Q: Fascinating.

Yes. And what's more is that the path of the old Croton Reservoir is now a state park. It's mostly up in Westchester, that's where it's most obvious, but there actually is a park in North Manhattan that is part of the city parks and you can walk along the path of the old Croton Aqueduct. So it's worthwhile doing it.

Q: How did you learn about the city's water system? It sounds like--I mean, you just rattle it off like it's kind of second nature for you.

Well, I've been curious about it for a while, so I've read a fair amount about it. One good book is **Liquid Assets** by Diane Galusha. She was a woman who I mentioned who gave a talk a couple of years back for the NYC H2O events. And another book is **Water-Works.** That was, as I mentioned, edited by Gena Pollara and Kevin Bone from Cooper Union, and just reading on the Internet Wiki and just random websites.

Q: That's great. I love how intimately familiar you are with the water system in New York. What's your background? Where did you grow up? What was your family like? What was your life like when you were a kid?

I grew up here in New York City. At the time the neighborhood was called Alphabet City. I grew up on First Street and Avenue A. Now it's called the East Village. The neighborhood was a little different back then, but still an interesting neighborhood. There were a lot more artists. Back then it was a little bit raw. Now it's still a terrific neighborhood, a lot of terrific restaurants and a lot of activity.

So having grown up in the city, and not really knowing too much about the water system other than when my teachers would say, "Oh, we have good water and that's why we have good bagels and pizza," and my parents would say the same thing. I never really learned more than that and so I was curious about the water system, having grown up here and I'm glad I've had the opportunity to find out more about it.

Q: What did you study in school? And where did you go?

I went to high school at Stuyvesant High School here in the city; and college down at the University of Virginia. Both places provide an excellent education. And I happened to study math – engineering math. And so I had some engineering education, which is part of the reason that I am pretty much very interested in the history of the water system, because there are some incredible engineering feats that had to be figured out in order to bring the water into the city.

As the city grew, the demand for water grew, and we had more immigrants coming in from Ireland and Italy in the middle 1800s and so we needed more water. And the city's aldermen recognized that and the water department recognized that and so they, in the late 1800s started looking to expand further into the Catskill Mountains. And in the early 1900s they started building the Catskill system with the Ashokan Reservoir, which is about 100 miles north and a little bit west of the city. And in order to get the water from there-- it flowed down to the city by gravity. And I should have mentioned before, the Croton Reservoir, the water flows mostly by gravity, and the Catskills system, the same thing. The Reservoir there is about 600 feet or so in elevation and the city is basically at sea level, it's at zero feet elevation. So it's able to do that.

That being said though, it has to cross under the Hudson River, and so they had to dig down 1,000 feet, and they had to go through mountains as well, because the Hudson River is flanked by mountains on either side where it crosses near Cold Spring, New York, which is close to West Point, right on the Hudson River. So again, just some incredible engineering feats; I think at the time it was considered the eighth wonder of the world, as it was the most astounding feat of engineering constructed up to that point.

Q: I was at a talk at Columbia about climate change and how it will impact New York City's water supply. And somebody from the city was there talking to students, making an appeal to them to consider working for the city, because he said so many of the old timers working in the city water system are retiring and they are losing history. But he said it's basically one of the most complex systems that you could work on and lots of people have come in as young engineers and retired from the system.

Yeah. Well one of my goals of offering these events is to attract people to learn more about the system, and if they are interested in being engineers, to become engineers that work on the system, because it's really for everybody's benefit.

Q: That's actually one of the questions that I have for you was, especially as a teacher, you deal a lot with – I realize you are not teaching, you are tutoring at this point, versus teaching in the public school – but how do you get kids interested in the environment? And how do you get them interested in things like water conservation, and environmental protection and making the connection that the health of the environment impacts their own health?

Yeah, it's a good question. The best way to get kids interested in the environment is to take them outside and actually let them experience it, and eventually I hope to offer all these programs to grade school students and high school students and even middle school students, because they drink water and kids, especially are naturally curious. And to foster that curiosity is the best way to teach.

An "Aha" moment that I had, I was San Diego visiting my sister, I have two sisters, one lives out there. And there is a field trip to La Jolla, and I just happened to be swimming or walking in La Jolla, I can't remember, but by the beach, and there was a school group that the life guards were taking out into the water with fins to swim with the seals. There's an underwater nature preserve in La Jolla, and so this was kind of like a field trip, but in the water, and all the kids could swim, obviously, but they were with a few lifeguards. And I thought, "Wow, what a great way to have the kids get an appreciation for the water, and want to make sure that that water stays clean and make sure that garbage doesn't wash into it, and sewage doesn't wash into it, because they are getting a chance to really appreciate it by being in it and seeing the incredible stuff inside the ocean.

Q: And hopefully making that connection that their actions on land impact what happens in the ocean.

Exactly!

Q: That's one of the things that we struggle with here, is "How do we create a message that people can make sense of that isn't too wonky and isn't too dumbed down, and is simple, but is still effective?"

I think one thing that's very important, and while I think it's an easy place to start, I know that it's not because the bureaucracy of the New York City public school systems is quite difficult to navigate--but the New York City public school systems do not recycle. And the best way to get people to recycle is to start the habit early. And if you are not doing that in school, then you are not going to develop that habit. There is a group of teachers who have been trying to work with the city and the UFT [United Federation of Teachers] to bring recycling into the schools and they've been working real hard at it for several years. It's a very slow process and I give them all the credit in the world for having the patience. It's Micki Josi and Coquille Houshour, they have an organization called, Educating Tomorrow, and they have a website called www.educatingtomorrow.org. And they are doing just that. They are trying to get a systematic way to offer recycling in schools, but it's just in the beginning.

Q: That's amazing. It's amazing that a huge entity like that doesn't recycle. I mean, I think a lot of the businesses in the city do post-collection recycling, which they claim is more effective, or post-collection sorting and recycling, I should say, which they claim is more effective than sorting before collection, but I don't know. I mean, it would be interesting to see an actual study done on that.

We've gone through that in this office here because they don't have recycling here, but someone from here followed the trash and did a video and they sorted it all out post-collection. I guess the feeling is, with office buildings and places like schools, there isn't the same kind of organic waste in diapers and stuff like that, so they can have a fairly dry waste stream that they can separate. But I don't know. It's a habit. I think it's a mindset habit that kids need to get into.

I agree.

Q: Why did you become a teacher?

I always enjoyed teaching; even in school I enjoyed helping my classmates if they asked me questions. And when I was at school in Virginia I was a teacher's assistant and I enjoyed that. And after school though, as I said, I studied math. I worked as an actuary, it's kind of like a statistician, but they are geared towards the insurance industry. So I worked in an office for a couple of years and then I decided I really did want to teach. So at that point I moved back to New York City. I was working in Philadelphia at the time. I started teaching about 10 years ago and I've enjoyed it and I still enjoyed teaching. And that's part of the reason that I offer these water tours, because I enjoy learning about the stuff as well as sharing that knowledge with other people as well.

Q: Where do you think we're headed with public education in this country?

That's a tough one. I like to remain optimistic. I think there's tremendous potential

Q: It's a tough question.

It is a tough question. Let me say this, yesterday I had a wonderful experience and I want to make sure that I answer your question. But a few weeks ago I gave a tour of the Yonkers Sewage Treatment plant, and you were on that tour.

Q: Thank you very much.

Thank you for the pictures and you wrote a lovely blog on this website, which was fantastic.

One of the gentlemen on the tour was a man named Franklin Hetley, and he is a principal at a small charter school in Long Island City that he started about three years ago. And he invited me in to give a workshop about this teaching tool that I developed to teach fractions in a hands-on way. I call them Satisfractions. They are available online. And so he invited me in to his school to do a workshop about my teaching tools and to show them to his teachers. And when I got there he gave me a tour of the school. And he had brought me into every classroom and in every classroom the students were engaged. And part of the reason was because they focus on art and music at that school. And right now it's only Kindergarten through third grade, but kindergarten and third graders, they love art and they love music, as everyone does, of all ages. And they partner with artists and musicians to teach the class together with the teacher. And half the classes had some kind of music going on and in every case all the kids were incredibly engaged, either singing in unison, playing the recorders in unison, clapping or stomping, slapping their thighs, snapping, whatever it was, and I was so touched by it, because I was so motivated. And I just realized that public education can be incredible. I was lucky; where I went to school I got an excellent education at Stuyvesant High School. There are schools that are incredible, but there are many schools where it's just babysitting that's going on. There's no respect for teachers, and that's on the part of students as well as administrators, they don't give teachers the support that they need and it's a major problem. So there's tremendous potential for education, public education, and I hope changes are made, because we need smart people that are educated.

Q: I already asked you about reaching students with an environmental message, so in the environmental education that you've done, what's been the biggest challenge for you? Has it been working with kids or is it more with adults?

So the logistics is interesting. Working with kids is a logistics issue, because you have to reach out to schools, and you have to get permission slips and all this kind of stuff; and everything has to be taken care of well in advance. Right now my programs are offered to a general audience, and I target teachers because it's my hopes that teachers can then turn

around and use the knowledge that they get and share it with their students. But my hope is that eventually I can offer these programs directly to students. It's a logistics challenge and right now I'm kind of building a reputation for myself, putting this kind of curriculum together, if you will, and so I would like to offer it directly to students.

Q: That would be great, I mean, I just think it would be fascinating for kids to be able to go to a sewage treatment plant. And like I said in the post I wrote, "See where things go once you flush the toilet." And even if you're getting them through their sense of smell, at least you're reaching them somehow.

So what's been the high point so far for you with all of the programs?

It's been very nice that the programs have been well received and well attended, so it makes me feel good to know that people are interested in this stuff and they find the programs valuable and they learn from them. And the people that come on the programs are super interesting, you know, people like yourself that write about the environment, and this gentleman I was telling you about, Franklin Hetley, who has the charter school in Long Island City. We had an attorney general come on the sewage tour. We had the head of the NRDC come to the history talk about water. Peter Lehner is the head of the whole thing. And we had some engineers come and just really interesting people. We had the historian for the Borough of Manhattan, Michael Miscione, come, and Sidney Orenstein who is like the guru for New York City geology and history. He happened to grow up on Fourth Street just a couple of blocks from where I did. And he was an educator at the Museum of Natural History for over 30 years and he still gives tours around Manhattan. His favorite spot is around Inwood Park, up in that area, because the geology is so varied and it's beautiful up there. And I always try to go to his lectures or walking tours and stuff, because they he's just a wealth of information. And so that's certainly a highlight, meeting all these interesting people.

And then the speakers themselves, Gina, who was the editor on the book **Water-Works**, just told a terrific story of the history of the water system, and her whole story of putting the archives for the water department back together after they had kind of been let go for a while. We had a sandhog named Scott Chessman - the sandhogs are the construction workers that dig the tunnels for the city. Like the Second Avenue tunnel right now is being dug by the sandhogs, and Scott is working on that tunnel right now. Before that he was working on Tunnel #3, which is the city's new water tunnel. And he is just a super bright guy and easy to talk to, and humble, but he is the man to go to, he is the man that the construction firms go to, to decide what kind of drilling they can do. They show him the core samples before they bring the heavy equipment to make sure that they know what they are doing. That was two years ago that we had the Sandhog talk.

And last year, we had Bob Martore come. Bob Martore is the Natural Resource Director for Artificial Reefs down in South Carolina. He is just one of these guys that found his calling in life. He's a marine biologist and it's just something that he was always interested in. So the connection with marine biology in New York City - besides us having our own harbor - is that, for a while, we were sending our old subway cars that we

were retiring, down and sinking them off the Mid-Atlantic coast about 20 miles out at sea to become homes for fish, basically. And so he came up to talk about that, because South Carolina took a couple of hundred old subway cars and he goes down on regular intervals to photograph them and take video tape of them to see how the sea life grows on them.

Q: That's fascinating. I'll look to see if I can find a website.

I have one. I now have a link to it on my website, www.newyorkcityH2O.org and if you look for the subway reef talk you will find it.

Q: Great. What do you say to people who don't embrace conservation? Like, what happens, what do you do when you see someone who is abusing a waterway, for instance?

Sure. I have to think if I've had an experience where someone, where I caught somebody dumping some noxious material; I don't know that I have. But that being said, what do I say to somebody that doesn't have an interest in conservation? Well I'll answer it this way: I try to have my talks be on topics that people can relate to, like subway reefs, like drinking water, like sewage. I mean, it would seem to me that if you would ride the subway you would at least be curious to find out that when this subway is used up, it's going to be stripped, the wheels are going to be taken off, and they are going to steam clean it and then they are going to put it on a barge and ship it 20 miles out at sea and push it off, and it's going to sink to the bottom and fish are going to live in it. So again, I try to offer programs that, you know, people can relate to, that people will find interesting, and hopefully draw them in that way, at least get them thinking.

Q: If it's not a direct way in, indirect is just as good, right? Is there a message about water or the environment that you really want people to get?

I guess, obviously, water is super important and we're very lucky in New York City, especially to have good quality water. But there's a lot that goes into it and it's my hope that as many people as I can reach will appreciate that and hopefully reach students and encourage them to work in that field so that we can continue having good quality water.

Q: Do you ever drink bottled water?

I try not to.

Q: Yay! That's the right answer. Two more things. One is, will you just give a brief bit of information about the upcoming trips one more time and then also restate your website at the end of that.

Of course! There's two upcoming trips. The first is Saturday, April 23rd, it's a bike tour of the Bronx River, and it will begin at the Concrete Plant Park, which is in the South Bronx - that will be our meeting place. And we'll backtrack a little bit to Soundview Park which is at the mouth of the river, that's where the river empties out into the Long Island

Sound. And then we'll bike up along the river, to Valhalla, Westchester, which is about a 25 mile ride, and people are welcome to stay for the whole tour or duck out wherever they want. Since we'll be in the Bronx they can hop on the subway. And the information again, is on the website at www.newyorkcityh2o.org. And the second tour will be Sunday, May 8th and it will be a stream ecology hike, up near the Rondout Reservoir and it will be led by Mark Vian who is a stream ecologist for the DEP, that's New York's Water Agency. And he'll explain, as we walk along the stream, how he monitors that the stream is healthy, to make sure that it's not eroding in a bad way. in which it can bring in too much sediment into the reservoir. Sediment is bad because we don't want to be drinking dirt; we want to have as pure a water as we can have.

Q: All right, well thank you, Matt. I enjoyed talking with you.

Thank you Robin, so much, for having me in. It's great talking to you.

Q: And I'm hoping to be able to make the walk on May 8th.

Wonderful!

Q: You've been listening to a Grace Our Heroes Podcast. I've been talking with water educator, Matt Malina, about NYC H2O and about New York City's water. You can listen to this and other podcasts at Ecocentric Blog.org. This is Robin Madel. Thanks for listening.

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