

Q&A with George Santucci, President of the New River Conservancy

by Kristen Downs

In this Q&A, George Santucci, President of the [New River Conservancy](#) (NRC) discusses the role of data in NRC's water quality monitoring work with Internet of Water Policy Associate, Kristen Downs. The conversation covers NRC's relationships with three state agencies and the development of the [North Carolina Aquatic Data Hub](#), a community science water quality database that arose out of a partnership between NRC, [NatureServe](#), and the [River Network](#). The New River Conservancy is an NGO and community science organization based in West Jefferson, NC, whose mission is to protect the waters, woodlands, and wildlife of the New River Watershed, which originates in North Carolina near Boone and flows north through Virginia and West Virginia.

This Q&A interview has been edited for clarity and length with the permission of the interviewee.



Figure 1: Aerial view of the Greenbrier River, the New River's largest tributary. Photo credit: New River Conservancy.

The New River Conservancy

Kristen Downs: Good morning, George. Thank you for joining me. Today we're here to talk about the [New River Conservancy](#) (NRC) and the great work that you do in the New River Basin. I'd like to start by getting some background on NRC. Can you tell me about the New River Conservancy, its mission, and how and where it works?

George Santucci:

The New River Conservancy is an organization that is more than 40 years old. We were founded and created here in North Carolina in the Jefferson-West Jefferson, Ashe County area because of a dam that was going to be built on the New River that would have flooded 42,000 acres of land. The project was

first proposed in about '62 and the community was galvanized to fight against it all through the sixties and into the seventies. At the end of the day, it became a massive fight between North Carolina and Virginia. Virginia promoted the dam because the power really would have gone there. It wouldn't have been used locally, and instead would have been on the grid and used in bigger communities like Richmond and places further north. So, of course, everybody down here thought that giving up all of our properties so people up north could have electricity didn't make a lot of sense. Ultimately, the governor of North Carolina designated the section of the river that was affected as a state scenic river. That emboldened and empowered our federal legislators to seek a federal wild and scenic designation for 26 miles of the river, which was approved in a Rose Garden signing in 1976. President Ford signed the bill that made 26 miles of the South Fork and a few miles of the main stem a federal scenic river. You can't impede the flow of a federal scenic river so that ultimately defeated the dam. And that's how [NRC] was created.

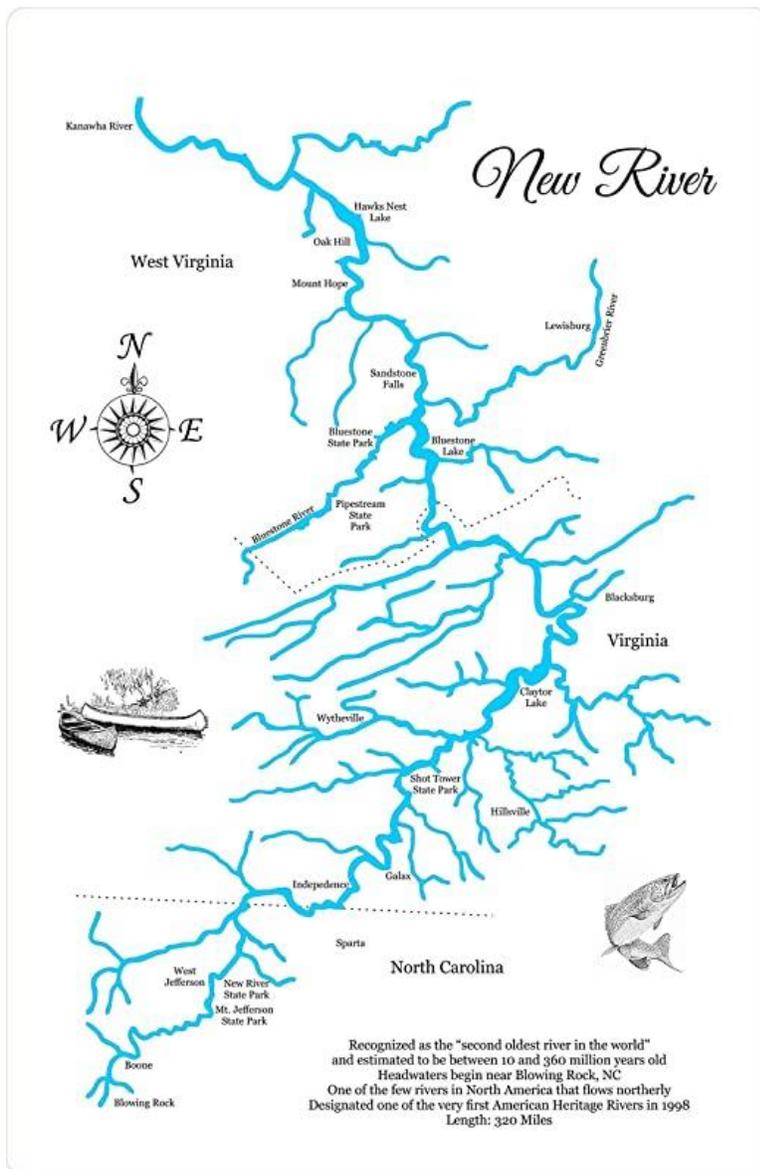


Figure 2: A map of the New River Basin, which runs from North Carolina through Virginia and West Virginia. Photo credit: [Personal Handcrafted Displays](#).

We've been working ever since to protect the water, woodlands, and wildlife of the New River watershed. That's our mission. We didn't incorporate, interestingly enough, until '91. January 11, 1991, is when we became a 501(c)(3) membership corporation. We have between 500 and 600 supporters a year that are members. Since then, we've become a nationally-accredited land trust. We acquire land for New River State Park and protect private lands through conservation easements. We have 40 [conservation easements] throughout the watershed to date and we're coming up close on 10,000 acres in total protected land. We started doing land-trust work in the mid-nineties. In the late nineties, we started our river restoration program. Since then we've restored riparian buffers on over 105 miles of river and stream in our watershed.

Then, of course, our water quality work is paramount. We rely on water quality data to guide almost everything that we do. If we lobby or advocate for a policy change or an improvement, it is based in science. One of the bigger water quality initiatives that we're working on right now is in the New River Gorge in West Virginia. The entire Gorge itself, and all the tributaries flowing into it, are impaired for bacteria, predominantly due to failing wastewater infrastructure. And so, we, of course, need to continue to rely on water quality data. As we work to do projects that improve water quality, we need to demonstrate that the improvements are happening.

Water Quality Sampling

Kristen Downs: What water quality parameters do you collect?

George Santucci:

We collect bacteria, dissolved oxygen, temperature, turbidity, pH, and we have now added conductivity. We found these small digital pen meters that are fairly inexpensive, so we started adding conductivity to our protocol.

We typically measure both fecal coliforms and *E. coli* because we work in three states and two of our states, [North Carolina and West Virginia], still use fecal coliforms as their predominant indicator for bacteria, and one, Virginia, uses *E. coli*. Both North Carolina and West Virginia are considering transitioning to *E. coli*; they just haven't made that change yet. I think it's partially a political thing and partially a capacity thing because agencies would have to develop all-new protocols around it. In West Virginia, one of our bigger partners is the [National Park Service](#). Their lab has now adopted the IDEXX system for monitoring and analyzing bacteria, which is predominantly an *E. coli* system. They've been gracious enough to process our samples and, therefore, we're getting *E. coli* as our responses up there. We've gotten the DEP [West Virginia Department of Environmental Protection] to accept the *E. coli* counts, but they're held to the fecal standard [of 400 colonies (CFU) per 100 mL] because they don't have a protocol for *E. coli*, even though *E. coli* should have a lower threshold. In Virginia, the *E. coli* standard is 200 colonies (CFU) per 100 mL, which is about half of the fecal standard in West Virginia.

We also do a lot of objective assessments on habitat. We have a habitat assessment form that's based on an EPA form. The monitor completes the assessment on an annual basis and records any changes to habitat that have occurred, such as land disturbances or land-use changes in the watershed.



Figure 3: A New River Water Monitor tests the pH of a water sample in the New River (left). Volunteers remove waste from the river in a clean-up event organized by the New River Conservancy (right). Photo credits: New River Conservancy.

The North Carolina Aquatic Data Hub

Kristen Downs: The [North Carolina Aquatic Data Hub \(NCADH\)](#) will provide a free water quality monitoring database, open to community science organizations across North Carolina. This database will allow community science water quality data to easily be shared with the state and other parties. NCADH will also provide a comprehensive set of water quality monitoring protocols and procedures, and training to groups who would like to adopt these protocols. How did the North Carolina Aquatic Data Hub originate and develop?

George Santucci:

Our big North Carolina water quality initiative is the [North Carolina Aquatic Data Hub](#). You might argue that there's mission drift or creep because it's a statewide initiative instead of a focus on our watershed, but [the NC Aquatic Data Hub] has improved our water quality monitoring program so much that it is easy to justify. The State lacked a cohesive citizen science program for us to participate in, so, we are also serving ourselves in facilitating the Data Hub.

The idea for the Data Hub arose when we were applying to the [Z. Smith Reynolds Foundation \(ZSR\)](#) for money to support our water quality monitoring program, and [NatureServe](#) was applying for funds to create a data hub [through a] citizen science program statewide. The [River Network](#) was also interested in citizen science water quality monitoring, and all three of us went to ZSR. Hawley Truax, who is the environmental program coordinator for ZSR, told us that we were all asking for the same thing and that we needed to get together and make one ask. So, we all met together and talked it out. It just so happened that NRC had the most bandwidth to apply for the grant, so everybody agreed that we should go ahead and apply for it. We were successful in getting a two-year grant for \$160,000 at the end of 2016. The work started in 2017 [and continued into] 2018. Then in 2018, we leveraged an additional \$70,000 from the [\[National\] Fish and Wildlife Foundation](#). The [North Carolina Natural Heritage Program](#) was really supportive of our work and recommended the Data Hub for funding. The additional \$70,000 carried us through most of 2019.

Kristen Downs: You've talked about how the North Carolina Aquatic Data Hub got started and how it's evolved. Can you talk a little bit more about how it works, the data that you use, and the data management process?

George Santucci:

Something we quickly learned is that you can teach people how to collect data. At the end of the day, you really want your data to make a difference, not just in educating the population, but also you want it to get to state agencies so that they can make policy changes based on the data. But state agencies can't accept data unless it has certain parameters or qualifications.

The sad part about almost every citizen science water quality data program is that they have file cabinets and file cabinets full of data forms that are sitting there yellowing. We quickly realized that we needed a tool or a mechanism to allow people to manage, analyze, and disseminate their data to their stakeholders. If you've got a donor giving you money to go out and collect water quality data, that donor deserves to know what kind of data you're discovering out there. For example, one of our partners developed some pretty neat reports for their clients. If we wanted to work with them, we could collect the data, submit it to them, and they would analyze it in the lab, and produce a nice paper document with graphs and comparisons. It was a step in the right direction, but it's still a paper document, which doesn't always help to disseminate the information.

The [River Network](#) and [NatureServe](#) were instrumental partners in this project. [Adam Griggs](#), with the River Network, is steeped in the work that's been done in the Chesapeake Bay. [Griggs] told me that they had an Access database that was developed specifically for the Chesapeake Bay, and that we could borrow and modify it for the North Carolina Aquatic Data Hub's purposes. It already had the structure to manage the water quality data in the way that it needed to be managed. I thought this was a great idea because I'd rather not reinvent the wheel. Our other critical partner was [Michael Lee](#), a database programmer for NatureServe who has done all kinds of software development to help them to house and manage natural heritage data across the U.S. and internationally. Together, we had a top-notch database developer and a database that we could start with. While Michael didn't know anything about water quality, he certainly knew about software development, and Adam knew a ton about water quality. So, we just put those two guys together. We flew Adam down from Maryland and he spent a week in Durham with Mike Lee and they hammered out a database, [which ultimately became the North Carolina Aquatic Data Hub].

At the end of the day, we realized that all the metadata associated with the data needed to be in the database so the state agencies would be able to use the data. The metadata includes the protocol used to collect the data, the equipment used to collect the data, and the EPA's method code. If you use a certain method to, for example, collect dissolved oxygen, it has a three-digit number—or method code—that is associated with it and needs to be attached to the data. Our database attaches the method code automatically. When you develop and use the [NC Aquatic Data Hub] database, you first enter all the information about your organization and program, and then you can set program defaults. If your program always uses a Winkler titration as your dissolved oxygen collection method, then you just enter that as a default and the method code associated with it. Then, every single time you record dissolved oxygen, it knows you use this method to do it and it attaches that method code to the event that collected the data. If you want to send that data to the DEQ [Department of Environmental Quality] or to the EPA [Environmental Protection Agency], all that metadata is attached. Additional metadata is also automatically attached including, HUCs [hydrologic unit codes], geolocation data, hydrologic data, etc. The metadata enables these agencies to accept data from citizen science groups, knowing that it's

not just some random data that they can't quantify. [Government agencies] might look at the metadata and categorize a method as Tier 2, but they can at least quantify that and know the quality of the data they receive. Tier 2 data is in the middle [of a three-tier system with 3 being the highest quality].

The database we developed has all kinds of customization in it. While it does say North Carolina Aquatic Data Hub at the top, there's a place for you to stick your logo, your program name, your organizational name, [etc.] Then all the reports it generates will come from, say, the New River Conservancy, or from Ellerbe Creek, or whatever the organization is. When you show the data and database to a donor or somebody in your office, they recognize that it's Ellerbe Creek's database and it's not some package that looks foreign to them.

Data Quality, Quality Assurance, and Quality Control

***Kristen Downs:* What are the tiers for data quality and how were they developed?**

George Santucci:

We realized that we needed to have multiple levels of data based on the knowledge or the resources that a citizen science group has and the robustness with which they want to develop their water quality monitoring program. Tier 3 gets into thousands of dollars, Tier 2 is hundreds of dollars, and Tier 1 is less than a hundred dollars.

If a community science group just wanted to dip their toe in the water and get started with a really inexpensive educational program to learn more about their water, that's a Tier 1 system. We developed a Tier 1 system initially, but we've learned that the state actually has a well-developed Tier 1 system. So, while our Tier 1 system is still there, we're really encouraging people that, if that's the level they want to participate at, they really should just go straight to the state's [NC] [Streamwatch program](#). Then the data goes directly to the state and the state knows its quality. It's an easy way for people to get started. Then once they realize the limitations of a Tier 1 program and they want to have a bigger impact and step up their monitoring, then they're into the Tier 2 world.

The predominant difference between Tier 1 and Tier 2, is that Tier 2 has a QAPP—a Quality Assurance Project Plan. We have a really robust protocol for the Tier 2 level to ensure the quality of the data. A manager is assigned at your organization who is in charge of ensuring that that data has met all the protocol parameters and quality assurance plans, and can certify that that data was collected appropriately and submitted appropriately to the agencies.

At Tier 3, you're doing things at the same level as the state's Division of Water Resources (DWR). The big difference between Tier 2 and 3 is that Tier 3 data goes directly to what they call "Assessment Level Data." For example, if a stream is listed on the 303(d) federal [Impaired Waters Stream List](#) and you want to make the case that its water quality has improved enough that it doesn't need to be on the list anymore if you collect data at a Tier 3 level, you can build that case and say that the water quality has improved sufficiently—or the opposite. If you're arguing that your stream belongs on the 303(d) list and DWR has not listed it yet, you can also build that case if you collect the data at a Tier 3 level. Using Tier 2 data you can build either case, but it would have to be verified at some point by Tier 3 level assessments.

Tier 2 water quality monitoring serves a pretty important role. Enough Tier 2 data indicating a trend that is better or worse could drive DWR to come out and do an assessment of its own to make the determination of whether a stream should be off or on the list.

Kristen Downs: What does it take to develop the QAPP, [or Quality Assurance Project Plan]?

George Santucci:

It's a pretty extensive document, which should cover initial things like site assessment; safety protocols; and liability issues such as having public access for sampling or, if the sampling is on private land, then having an agreement with a private landowner to allow a monitor to go onto the property to test the water. Then it gets into the actual water quality with steps and protocols for how you collect dissolved oxygen, pH, temperature, turbidity, and other water quality parameters. As part of the QAPP, we train monitors and recertify them every 12 months to make sure that they're still doing the protocol the way they're supposed to.

Kristen Downs: Are, quality assurance and quality control (QA/QC) part of the QAPP?

George Santucci: Yes

Kristen Downs: Could you tell me more about the QA/QC steps?

George Santucci:

The protocol for the data submission is:

- (1) The monitor goes out to the field for sampling and records the data on a data field sheet.
- (2) Then they go home and enter the data onto an online Google form that we have [as part of the NC Aquatic Data Hub] and submit the data digitally. This is the first opportunity for some kind of error or quality mistake. The monitor could move a decimal place. They could just write the wrong number down in the wrong field.
- (3) Suzanne [Joyner], our quality assurance manager, will review the digitally-submitted data.
- (4) The monitor is also then required to mail or deliver the actual field datasheet to our office.
- (5) Once received, our quality assurance manager will compare the field datasheet to the digital version.
- (6) Once she's satisfied that all the digital data matches the field data sheet, she checks for outliers to make sure there aren't any numbers that are too far out of range, like a pH of 27.
- (7) Even if a number is within the acceptable range, but it's historically out of line with the normal range of data that's been submitted for that location in the past, she'll go back and question the monitor to see if there was some anomaly that she can check the data against, such as rainfall or other things that happen nearby. We are required to record any anomalies. Maybe the atypical data could be explained because there was a significant rain event or some other disturbance like the clearing of a bunch of land on a property upstream, which caused a huge turbidity load.
- (8) Once Suzanne is satisfied with all that, she enters that data into our database.
- (9) Finally, she certifies the data. The database has a protocol that allows her to certify data so that when we submit it to the state or the feds, they know the quality assurance person has certified the data and is putting their stamp on it to attest that the data has been collected and reviewed with the proper protocols.

The Roles of Data and Trust for Community Science and States

Kristen Downs: Interesting. Going back to this idea of the QA/QC, you talked a little bit about the importance of the federal government or the state government accepting data. Could you elaborate on why that's important for community science?

George Santucci:

For us, one of the most important things is that the [Clean Water Act](#) is the primary tool for protecting and restoring waters. Section 303(d) of the Clean Water Act is critical. It uses data to determine whether a stream is healthy or unhealthy based on whether or not it exceeds [\[total\] maximum daily loads \(TMDLs\)](#) on certain water quality parameters. If it does, an implementation plan is developed. This process releases funding through section 319 of the [Clean Water Act](#) to improve water quality.

While one of [the New River Conservancy's] primary objectives is to maintain the high-quality of the water we have in the New River watershed, we admit that not every single stream in this watershed has high-quality water. And if we're not fixing the ones that don't then, as far as we're concerned, we're not doing our jobs.

The only way you can fix it is to leverage all the resources you have at your disposal. We're talking about projects that can cost hundreds and hundreds of thousands of dollars. That kind of funding is not typically something available at the state or community level. We need a federal match on a lot of grants. So, we've regularly leveraged grants from the [Clean Water Management Trust Fund](#) (CWMTF) in North Carolina against 319 funding. We can get a half-million-dollar project done with \$250,000 from each source. That makes it an easier lift for each funding agency, and the state loves to know that they're leveraging federal dollars, making it a good use of and a return-on-investment for state dollars.

After big restoration projects, you need to be able to prove that the project is actually having the impact that you claim. You need to continue to do follow-up monitoring on those sites to show the reduction in loads. That can only be done through water quality data collection, monitoring, and analysis. The beauty of it is that the state and the federal government can both claim the success! You can demonstrate that it works, they can all say that we all invested the money through the Clean Water Act appropriately, and we fixed a water body in the United States. Who doesn't want to claim a win? I think you can use the water quality data to constantly go on about the negative state of the water, but I think it's also a great tool to go on about the positive state of the water. If it's a negative, fine, then let's fix it. Let's also use the water quality data to demonstrate that the implementation plans associated with the Clean Water Act work. If you do X number of projects, the load should be reduced to a point where it's acceptable and, if you get it done, what a great tale to tell. That's powerful.

Kristen Downs: That is very powerful. What is the role of trust in the work that you do and the data that you produce?

George Santucci: I don't know that there can be anything more important. Trust is probably the most critical part of it and why we jumped through all these hoops. Why we have QA/QC. Why we have a data manager. Why we develop these protocols and procedures and work hand-in-hand with state agencies. Sadly, we see it on a national scale every day. Science is being questioned constantly. Data can be manipulated, and data can be skewed, and there are all kinds of issues with that kind of thing. *But*, if you can transparently demonstrate the protocol, and it can be duplicated by anybody, then you have a way

to, at least, establish a baseline level of trust. If the same protocol is accepted by the EPA and by the DEQ or the DWR, and if we're all doing the same thing then *that* establishes the level of trust.

Community Science Organizations Working with and Across States

Kristen Downs: The NRC works within North Carolina, Virginia, and West Virginia, as you've said. Can you tell me about the challenges of working within multiple jurisdictions at the same time?

George Santucci:

That is the interesting part about our democracy and federal acts like the Clean Water Act. Each state has the latitude to interpret parts of the Act as they choose. A simple example is that states are allowed to use fecal coliforms and/or *E. coli* for a bacterial indicator in a water sample. Science would tell us that *E. coli* is a much better indicator of harmful bacteria in water versus fecal coliforms, which is a broader indicator. Unfortunately, by a fecal standard, you could probably say that every single water body in the state is impaired for fecal coliforms because it's so prolific. And that's not really fair, I don't think. It's not really a good indicator of human health concerns in water bodies. Whereas *E. coli* is a much narrower indicator. *E. coli* is a bacteria that can only live in warm-blooded animals. Fecal coliforms can be found in wood pulp—it doesn't have the same ecosystem needs. *E. coli* wants to be in a 99°F environment. Using *E. coli*, we can tell right then and there that at least it's from a mammal and, therefore, harmful to other mammals, which is the big concern.

These differences in water quality parameters are an example of the challenge of trying to develop a citizen monitoring program that's consistent across three states and when those states require data that is different. So, we ask our North Carolina and West Virginia citizens to collect both fecal coliforms and *E. coli* so we have the comparative *E. coli* data across all three states. In Virginia, they just collect *E. coli* because that's what Virginia wants and we agree that *E. coli* is a better indicator. You want to compare apples to apples. You don't want to compare fecal bacteria in one state to *E. coli* in another state. If you did then people could start questioning you about the data—and that's where you erode trust. So, if we can say we're comparing *E. coli* to *E. coli* to *E. coli*, there are no worries.

And then, of course, each agency supports citizen science in different ways. Virginia actually has the most robust, well-developed citizen science program. North Carolina, through the NC Data Hub, has made great strides and I see a really robust statewide citizen science program in North Carolina coming from this initiative.

I think it's just dogged determination on our part. We just wouldn't go away and we kept proving to them that we could develop a database that included all the requirements. We spit out a report from the database and Cam [McNutt, data manager at NC DEQ] said, "Wow, this is exactly what I asked for." We told him, "Yeah, that's what we wanted to give you." Now Cam goes around telling everybody that if you want to submit data to him, you need to use the North Carolina Aquatic Data Hub database; otherwise he won't take your data. And that's a big feather in our cap.

Kristen Downs: Yes, it is. Can you expand on that and tell us a little bit more about your relationship with the states, or take North Carolina as an example, and discuss how your relationships have evolved and how you've approached working with them?

George Santucci:

When the Data Hub initiative started, we made every effort to get DWR [the Department of Water Resources] involved through a grassroots approach. We got the field staff involved first. They were the ones that really saw the value and wanted to participate. Lauren Housley, [North Carolina DENR Benthic Biologist] from the biological section [of DWR], goes out and does bug collection all the time. She was enormously helpful. When we did trainings, even on SOS protocol (VA's [Save Our Stream](#)), which is a Tier 1 level protocol, [Lauren] would come out and help us with the trainings. Her knowledge of bugs is so prolific that she can just look at a bug and tell what it is. It was just awesome and really powerful for our volunteers to be learning from a woman with that background. Lauren and her colleagues started talking within the agency and her colleagues began to learn more about the NC Aquatic Data Hub.

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Figure 4: Water quality monitoring training for volunteers given by the New River Conservancy at a Virginia Water Watcher class. Photo credit: New River Conservancy.



Figure 5: NRC volunteers analyze water samples for benthic macroinvertebrates. Photo credit: New River Conservancy.

Brian Pointer, [from the NC DEQ Water Resources Department] in the chemical division, was also unbelievably helpful. I would go to their lab in Raleigh and visit with him and his staff to learn from them about some of the protocols they were using and let them know what we were doing. We'd discuss how these things aligned and assure them that we were developing the tier-based system. Their biggest concern is that they don't want somebody collecting data with a poor-quality method claiming that it's definitive proof of impairment or not. We kept assuring them that we were building all their concerns

into the protocols that we were developing, and it eventually went up the chain to Cam [McNutt], who is the state's data manager [and Environmental Program Consultant at NC DEQ]. I think that was the final hurdle. When Cam said, "I want this," and we'd get it to him, he'd fully embrace it. Cam has the ear of the upper administration and it was neat how it kept stepping up the chain more and more and more.

I've learned that in our work, instead of going to the legislature or a town or city council first, as a lot of people recommend, I want to vet it with the boots on the ground and make sure that they agree that what we're promoting is legitimate and not going to cause them greater work. Because, if you force anyone to do something they don't want to do, they're going to do a poor job at it and then you don't achieve the goal.

We took that approach with the DWR and the Data Hub. We just started working with people on the ground and if there were red flags or if they were concerned for any reason, we'd address those immediately and try to figure out how to, or whether we could incorporate or moderate that concern. I think it all goes back to that trust level you brought up a while ago—they started to trust us. They believe that this isn't a short term effort. I think dogged determination is, again, the key. We did not go away. We were not a flash in the pan. We were not just something that just sounded great and went away. We've been around for years now and we're not going anywhere. And they know it.

***Kristen Downs:* It seems like having an open and receptive posture, as well as a long-term relationship that you were willing to develop from the ground up, have been two big pillars of what you and NRC do. Do you have any other advice that you would offer other community science programs?**

George Santucci:

Yeah, I think the other piece of advice is that you might be the expert, but there are a lot of experts out there. It's critical to value and accept other people's perspectives. From your stance, you might not be able to appreciate their perspective, but be open to changes they ask you to make, even if they might not logically fit with your original intent. If you can just take a step back and look at it and recognize that if it's not really in conflict with our original intent either, why not?

The other benefit of collaboration is that they take ownership. If they said they want it done this way and you actually do it that way, then it's theirs. They now own it. I think that's why Cam is recommending our database, because it met all his needs. I think valuing those perspectives and allowing others to own it is absolutely critical.

The other thing I would say is that, of course, agencies are run by people and people have their own way of doing things. You really need to be sensitive to the way those folks do their job. And then, of course, every state data manager is different.

***Kristen Downs:* At what frequency do you report to [EPA's Water Quality Exchange \(WQX\)](#) ?**

George Santucci:

We don't have a regular schedule; there's no requirement from EPA on that level. It is really just a data repository, so we just submit when we want. If we know the state is going to submit the data too, we probably just don't bother because it helps the state meet the requirements of the EPA. That's another partnership where you can help and the state sees you as an asset. With the additional community science data, they have a more robust data set to submit to the EPA.

I think there's a lot of interests that are aligned between states and community science organizations if people would just see the benefit. It's all backscratching, right? If the agency looks good because they are submitting a ton of data that's got all kinds of quality assurance around it, then that's great. You ingratiate yourself. Then when you call them for something, they are more willing to answer the call and do what they can do to help you out.

Kristen Downs: It sounds like it's furthering both of your missions.

George Santucci: Absolutely. At the end of the day, all we want is a clean New River and to have the protections and policies in place that are going to ensure that it all gets done.

Learn More

- A short video on the New River Water Watchers of the New River Conservancy: <https://www.youtube.com/watch?v=BuQOEQ2Jog0>
- New River Conservancy's Water Quality Monitoring Program: <http://www.newriverconservancy.org/nrwq/waterquality.php>
- NC Aquatic Data Hub: <http://ncaquaticdatahub.org/>

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Acknowledgments

- [George Santucci](#), President, New River Conservancy

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