

Turning the Tide, Saving the Chesapeake Bay

The Chesapeake Bay Foundation's biweekly, Tuesday morning podcast

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Title: Episode 5, *Digging A Little Deeper*

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Summary: CBF President Will Baker interviews Senior Scientist Dr. Beth McGee to discuss the how and why of urban stream restoration and the importance of addressing polluted runoff.

BAKER: Hi, I'm Will Baker, President of the Chesapeake Bay Foundation and welcome to our continuing podcast series—*Turning the Tide, Saving the Chesapeake Bay*. Today, I'm joined by Dr. Beth McGee, CBF's Senior Water Quality Scientist. We're going to have a conversation about [stream restoration](#). But first, let me give you a little background and draw an analogy. One of my other great interests is medicine. I grew up in a medical family and I'm on the board of Johns Hopkins Medicine. I've often been struck by the similarities between saving a complex system like the Chesapeake Bay and addressing human health issues. There's very rarely a simple path and there are very rarely simple answers. We learn more in terms of environmental policy, environmental solutions, just as we constantly learn more about medicine. I think you'll see a little bit of that in our conversation today with Beth McGee. So, with that Beth, let me thank you for joining us and start with a basic question or two. First, the most basic - could you describe the condition of many of our [urban streams](#) within the broader [Chesapeake Bay watershed](#)?

MCGEE: Sure, thanks for having me Will. If you think about what our urban streams look like, what you'll often see are very straight streams where the banks are eroded, they're what scientists call deeply [incised](#), there's a big gap between where the water is and where the shoreline is. As a result of that, it's pretty poor habitat for the critters that live in our streams.

BAKER: I know this is a complex question, but what is causing these problems? What are a couple of main drivers?

MCGEE: Historically, when we were building our streets and our houses, we wanted to get water off the pavement as quickly as possible, into storm drains, and ultimately into our streams. So there's this high flow in these areas where we still have that old way we did [polluted runoff](#) control. We have cases when the rain comes we get a lot of flow going into streams, and it basically blows out those streams.

BAKER: When we talk about this concept of stream restoration, give us a sense of what we mean by that?

MCGEE: It's trying to recreate the natural form of the stream. As I said, our urban streams are not natural, they're almost like little channels with eroded stream banks, so stream restoration is trying to recreate more natural streams. That means more curves in the stream, sort

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of [sinuosity](#), reconnecting what they call the [floodplain](#) to the area where the water rises should fill over into it adjacent lands. Reconnecting the stream with that floodplain is what we're talking about in terms of stream restoration.

BAKER: The purpose of that I assume is to bring back natural functions of streams that have been lost?

MCGEE: That's right. Natural habitat for the animals that live in the stream, and also what scientists have found is that natural streams actually do a much better job at removing pollution than do these urban, eroded, degraded streams.

BAKER: Nature is remarkably resilient and natural functions to actually mitigate the impacts of human development are ripe in nature, and streams are just one example of that.

MCGEE: That's right and we know for example from some recent work that if we reconnect the stream to the floodplain—so in other words when the flows are high the waters allowed to connect to the adjoining vegetation that there's [pollution removal, removal of nitrogen](#). It also can allow sediment to settle out. So the resiliency and the ability of nature to sort of clean itself, but it's what we're missing from many of our urban streams right now.

BAKER: So we know this is a goal and objective we're trying to reach, but it seems as if recently there's been a lot more interest. What's driving that interest? Is there any overall scheme in the Bay watershed that's pushing us that way?

MCGEE: The [Chesapeake Clean Water Blueprint](#), which is what the states and local governments are trying to implement to reduce nitrogen, phosphorus, and sediment loadings to our local streams, rivers, and ultimately the Chesapeake Bay—local governments are looking for what they can do to reduce pollution coming from their urban areas. Many of them are looking at stream restoration. As I mentioned, there are nutrient removal benefits associated with stream restoration, so many local governments are looking at that as something that they can do to achieve the pollution reductions that they need to under the Blueprint.

BAKER: And when you look at [the major sources of pollution](#), whether they be industrial, sewage, atmospheric, agricultural—the urban and suburban runoff category is the one category that has continued to increase, even as the others have begun to come down.

MCGEE: That's right and that's because we continue to [develop land](#), and it's also the most expensive thing we need to do to save the Bay.

BAKER: Pardon the pun, but let's dig a little deeper into this stream restoration concept. Can you give us a sense of just how we do restore these streams? What specifics are involved to better enable them to remove more of the nitrogen, phosphorus, and sediments coming into the Bay?

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MCGEE: In some cases it is reconnecting the stream to the floodplain. That could mean coming in with backhoes and removing dirt so you create less of a distance between the stream and the floodplain – so you're basically flattening it out if you will, which slows the water down and also allows the water to interact with vegetation that you would plant in that floodplain. Another example is putting in boulders and things, recreating the sinuosity, the curves in a stream and also putting some big boulders in that will have the same effect of slowing the flow in the stream down to allow the pollution removal processes to occur.

BAKER: These sound logical, they sound like no-brainers, some pretty positive outcomes, but now let me come back to that analogy of medicine that I mentioned at the outset. I recently read in a [Maryland Sea Grant](#) publication that there is some new evidence or evolving evidence and evolving ideas about just how well stream restoration works—where it works and where it doesn't. Can you give us any insight into some of the new information, the new science behind stream restoration?

MCGEE: Sure, first of all, we don't have a lot of monitoring data to say how well many of these projects work. It's a fairly new science and unfortunately we like to implement a lot and monitor less. So some of the claims and concerns that have been expressed about stream restoration are related to, are we giving them more credit than they deserve in terms of their pollution removal capabilities?

BAKER: So the worry is that restoration projects that could have a great deal of benefit in terms of local habitat, even beautification, making streams more attractive, may not actually be reducing the pollution as much as we have thought in the past and then that would affect how the computer models are programmed.

MCGEE: Well that and it also affects where a local government is going to invest their money. If they think they're going to get a lot of pollution removal benefits by doing a big, expensive restoration project then they're going to invest in that. If the benefits are less, they might choose to put their money elsewhere. That's the dichotomy in getting to your analogy of the patient—stream restoration is very expensive, it can be very invasive—ultimately what the cause of our urban stream problems are is what I mentioned at the beginning of the conversation which is that it's the polluted runoff, the volume of water that's coming off our landscape because it's [hitting paved surfaces and it's not soaking back in](#). Part of the controversy is, do you do something in the stream and ignore what's going on upstream, or do you try to address the ultimate cause to reduce that flow of pollution before you recreate the stream?

BAKER: Am I being overly simplistic in saying the goal really should be addressing the source of the problem before it's manifested in a major problem and trying to fix that, starting at the source, reducing the amount coming in, rather than fixing the patient or addressing the patients' needs after they have already become sick?

MCGEE: I think that's a good analogy. The science would suggest that it's not that stream restoration is never appropriate—it clearly is, it can have a lot of benefits—but ultimately we also need to address that as you say, the ultimate source of the problems, as well as fixing what has happened downstream because of those earlier problems.

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BAKER: To summarize, it would be helpful to try to state the Chesapeake Bay Foundation's position on stream restoration, because this is something that is certainly in the news a lot, a lot of people are working on it—volunteers like to work on it, governments are looking at it as a way to meet their requirements to reduce pollution in urban and suburban areas, so if you could restate your thoughts and how that translates to the Chesapeake Bay Foundation's position.

MCGEE: I think the bottom line is that stream restoration is not a one-size-fits-all for the problems of an urban stream. It certainly is appropriate in some cases, but that requires looking at the stream type, how much flow is coming into the stream, a lot of complicated science, before you decide that that's the appropriate remedy as opposed to doing pollution control measures upland and upstream of those. So it is appropriate in some cases but not all, and our concern is because of the pollution reduction removal efficiencies attributed to these practices, that it may be oversold and local governments may implement more than are appropriate.

BAKER: Do you have confidence that the scientific community is working on this and that we will have better answers in a year, two, three?

MCGEE: Yes, I think so. There was [a recent report](#) that came out of the [Chesapeake Bay Program](#) that looked at stream restoration and how much pollution removal credit should be given to them. It did have some qualifiers in there, many of them that I have related today. I also think there is increased interest in doing more monitoring of these projects so we'll have a much better sense at how well they do work under different scenarios.

BAKER: Well thank you very much. We've been talking to Dr. Beth McGee, CBF's Senior Scientist, and the one thing I would draw from all this is the standard of medicine, which is prevention is the best cure. Certainly it applies to pollution and cleaning up the Chesapeake Bay. There's always more to learn. We would have fixed the Chesapeake Bay a long time ago if it were easy. But we've got the best science in the world working on it, and here at the Chesapeake Bay Foundation we've got some of the best [advocates](#) working on it. Thank you very much Beth, and if anyone wants to learn more, please visit the Chesapeake Bay Foundation's website at [cbf.org](#).