

CDM Podcasts: Cities of the Future A Conversation with Mike Schmidt

PAUL: Hi, I'm Paul Brown, president of CDM's Public Services Group and host of our podcast series, Cities of the Future. In this series, we speak with experts about innovative and practical ways to create urban communities that improve quality of life, protect natural resources, and create economic opportunities. Our topic today is flood management and ecosystem restoration, and our guest is Mike Schmidt. Mike is a CDM vice president with 24 years experience in water resources and flood management. He has directed more than 120 stormwater and water resource management programs in 18 states within the United States. And he's guided the implementation of over 400 million dollars of multi-benefit capital improvements. Mike joins us today from our Jacksonville, Florida office. Welcome, Mike.

MIKE: Thank you, Paul. I'm glad to be here.

PAUL: Mike, let's begin with why we're talking about flood management and ecosystem restoration in the same breath. What is the relationship between these two activities?

MIKE: The common relationship is rainfall generally or a lack of it and so the most successful projects are those that consider the full range of water resource benefits – multi-benefits – and to combine them into a program that provides the flood protection but at the same time protects the ecosystem, recharges aquifers, enhances wetlands, and improves or enhances water quality, and – at the same time – where we can include public parks so that the public can be involved in the process, and they can also see the benefit, the value of their investment in their stormwater or water resource program.

PAUL: Well, let's talk about stormwater and flood management and, maybe, traditional approaches to how these fields were addressed.

MIKE: Yes. Traditionally, flood management has been to ditch and drain. It's been to try to put ditches into areas that were wetlands and retained or stored water and drain them off to allow development. As time has gone on, that ditching and draining has had an adverse impact in terms of our water supplies, the receiving water quality, and the impacts on the flora and the fauna – the wildlife in these systems – and so, in some cases, they're now in conflict. And, what we have found is the ability to bring those two occasionally mutually exclusive goals together in a comprehensive approach.

PAUL: Now, this ditch and drain approach that you're talking about, is it specific parts of the country where this is the traditional approach?

MIKE: It's pretty much across most of the country. Although of course as you get towards dessert or more arid regions they don't have to do perhaps as much as ditching and draining. But they still do have some significant conflicting issues there as well.

PAUL: And, from a flood protection standpoint, are we also looking at the protection of public property and public safety?

MIKE: Correct. In fact most programs start from this basic issue that there is some flooding and it floods homes, or roads, causing issues with emergency fire, police, or ambulance traffic. Occasionally, unfortunately, there may be loss of life and then the communities decide that now it is time to take action. Our programs may not be working we need to establish a level of service or performance standards for our system, evaluate our system to see where we are in terms of where the bottle necks are, where the problems are, and then prioritize a series of improvements to solve or reduce the flooding to meet our levels of service.

PAUL: Well, can you tell me a little bit about when a stormwater management turns into flood control. When does a typical storm become a flood?

MIKE: That's a good question. That will depend a bit upon the region. But, in general, somewhere in the 2 - 5 inches rainfall in over about a day will be somewhat of a threshold, and that might be considered a mean annual to a five year storm in terms of people relating it to a return period or a reoccurrence interval. So at that point, many of the systems across the country may not be able to accommodate that peak flow and things go into storage or start to pond and flood within the system.

PAUL: So, we're trying to do two things at once here, I guess. In a typical storm we're trying to provide adequate drainage and, in those events that exceed design standards, make sure that there is someplace for this water to go that doesn't interfere with people's property and safety.

MIKE: Exactly, in fact we often recommend that the communities extend their design standards to include the 100 year storm, which is the basis for most of the flood insurance mapping and flood plain maps that FEMA regulates. It's generally the elevation that people are required to

set their houses above and so we look at all the storms starting with the smallest events the half inch one inch events that cause the pollution so to speak from runoff, all the way through those events that can cause severe house flooding such as the 100 year.

PAUL: Okay, let's talk about the 100-year storm for a minute. That's a term that many of us hear, especially those of us who have flood insurance. What does it mean?

MIKE: That's another very good question. The 100-year storm by definition is an event that has a 1% chance of occurring in any given year. Or, you could also look at it as occurring every hundred years; although, the 1% chance is a more correct definition. But, with that said, most programs obviously have to use the data you have on hand. You're not collecting new information, looking to the future. So, when you take historic data and you look at the flows or stages that have been measured over the years, they reflect the past. They don't necessarily reflect future development. And future development as we have seen can reduce storage and increase runoff, which makes the flooding worse. So, it's not uncommon for a community to see multiple 10-, 25-, or 100-year storms in one given year because of the fact that we're using past data to try to predict the future.

PAUL: And the more impervious surface I have in an urbanized area – like paving or roof tops – the more flow will result from any given rain event?

MIKE: That is correct. And there are also, as we know, some changes in the climate that have been predicted, and we are seeing in some cases more severe hurricanes of longer duration exerting more energy and power, bringing more rainfall and even the tropical storms for example, some of them lasting longer and creating more rainfall.

PAUL: Tell me about the FEMA mapping process. I guess then once we've established what the 100 year storm is, you need to identify on maps where those storm flows are going to be and what property is outside of those limits.

MIKE: That's correct. The process looks at those stages, the elevations that the water gets to. And then from that looking at detailed topographic aerial maps, we identify the extent of the flood plain, the area of the flood plain, as well as the depth and the different locations. And, typically, the way that's been done over the history of FEMA has been to look at the past and in locations where there is large growth fast growth like parts of Florida and other urbanizing

areas such as Atlanta, and parts of Louisiana, and California for example, in some of those fast growing areas, by the time the analysis is done and the map is printed over a 3-5 year period, there could be enough growth that the map is actually outdated by the time its produced. And so there's a push to allow communities – through FEMA – to look at the future land use so that they can be more proactively prepared for the more extreme events.

PAUL: But if I'm looking at future land use, I'm projecting higher levels of flow and I presume the 100 year flood plain becomes a larger area.

MIKE: That is exactly correct. In fact, many of the typical development standards in practice today do not properly protect existing levels. So, it's not uncommon to be in a situation where the community will say, "we had controls for peak discharge and we had all the FEMA requirements and now we still have flooding." And, there are several reasons for this. First and foremost, FEMA does not preclude people from developing in the flood plains itself. You can actually have a loss of historic storage that may be inherent in the number that FEMA published for that map to begin with so it's like having a bathtub with a fixed volume. You start to put bricks or fill in that, it raises that water level. And secondly, the amount of detention required does not control the volume it simply controls the rate and not for all storms. And, so, it's occasionally the rate can be higher, for example, and the 100 year storm – if they're only protecting to the 25 – and the volume almost always goes up and so that bathtub analogy again if the drain is plugged for whatever reason – a tidal outlet or an undersized culvert – and you start to fill and now you've increased your turn on the spigot, it raises flood stages. So, in some cases in parts of Florida, for example, we've seen flood stages go up by over 5 feet compared to the FEMA flood levels. And, it can have very dramatic impact on flooding. So, we're working at several levels with the municipalities to have more stringent standard so they can avoid these problems because ironically, in many respects, this is the conflict with ecosystem restoration and ecosystem protection. When you have flooding as a result of these underestimated flood levels and increases in flow volume and flood level, then you have to come back, generally, with a retrofit flood control project, which often has to channelize the last remaining healthy riparian portion of the stream – which degrades the habitat, degrades water quality and is generally 10-50 times more expensive than regulating properly a sound development environment in the first place.

PAUL: So, the absence of a sound development environment drives us towards these structural expensive drainage systems that don't necessarily respect the natural environment.

MIKE: And that's exactly right. And, so, several of our clients have elected to go to a more sustainable or low impact type of development, which we've actually have been using those practices for over 20 years. And it starts with protecting the riparian buffer – having people backed up from the stream and to look through the trees to the stream as oppose to being right on the bank. And that way, kids have a place to play, the wildlife and habitat and water quality are protected, and when the big floods come, that storage is still there to accommodate it so you don't have these problems. And that can be coupled with the FEMA flood program so some communities such as Daytona Beach for example, has adopted some of these policies going back to 1987.

PAUL: So, you're talking about ecosystem restoration that then provides flood management values, benefits, and functions.

MIKE: Exactly. In addition to that water quality and in some cases aquifer recharge for water supply.

PAUL: With regard to urbanizing areas, what are some of the biggest challenges you face in a city environment?

MIKE: That's another excellent question. Among them are funding, available land to implement, particularly for those cases where I mentioned earlier development occurred they've encroached on the flood plain and now the last remnant of storage and conveyance is to channelize the last healthy segment of the stream, and of course in the current days, the economy itself. There have been some shifts, and so different communities are trying to do more with less. So, those are some of the challenges we face. Funding and available land, and of course, as always is to have a city council or county commission that is proactive and is willing to take a look into the future and consider sustainable proactive approaches that are fair and equitable to those citizens that are living there already, as well as those that about to move to their community and provide new development or redevelopment.

PAUL: Well let's just assume I am a city manager, and I'm looking at this problem. One of the things that immediately strikes me is that the institutional responsibility for these activities is

distributed among a number of different agencies and departments. How do I pull all this together?

MIKE: We have been very successful in helping to coordinate city, county, state, and federal requirements. But, many cities do have some difficulty in that, because you're right, watersheds are not are not consistent or equal to municipal boundaries. And it is very important that a watershed approach be considered not only for the flood management but also for the water quality or the ecosystem management. It's important in that they work together and build upon what the federal and state governments put down as the minimum standard and then provide further standards or more strengthened or enhanced standards to meet their more stringent goals that they may desire for a higher quality of life.

PAUL: This sounds like a very exciting vision of where things are going. Do you see this as a kind of revolution in the approach we're taking to managing water resources and stormwater?

MIKE: Yeah, I really do. I have been very fortunate to worked with some visionaries and have always believed in that.

PAUL: Well, it sounds like you need a vision that is more holistic that sees how you can combine the small scale micro scale kinds of activities that go along with low impact development and the bigger larger structural facilities that maybe we traditionally associate with stormwater management.

MIKE: That's exactly right, and for a perhaps a decade or more, through the 80s, there were discussions going back and forth about regional versus on-site strategies and which was better. And the answer is yes. They both are to some degree. Both have their issues. If you go too regional, you're too far down stream and you're sometimes destroying the very habitat and water quality system you're trying to protect. If you're too far upstream with a series of very small ponds, you've got these little very unmanageable systems around every convenience store in town and so the concept then is to have a balance between those small scale onsite requirements versus the regional or larger scale requirements that meets your goals for the overall program.

PAUL: You sound pretty excited about this.

MIKE: Yes. This is a fun job I have to tell you.

PAUL: Well, thanks Mike. This is Paul Brown. Please join us for our next Cities of the Future podcast.