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Stormwater

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WEB

In Search of the Silver Bullet

The ultimate pathogen destroyer

By Stewart McClure

Our search at Clearwater Solutions began about 5 years ago. Pathogens were starting to come to the forefront at municipal and state levels as a pollutant of concern. Tourism was acting as the driving force to start requiring stormwater permit writers to include a total maximum daily load (TMDL) for pathogens in impaired water bodies. And our industry was scrambling to try and find products that would help destroy or limit pathogen bypass in manufactured stormwater systems.

I mention tourism as the driving force because, as we all know, tourism equals profit. In this case, the complaints were coming from people who had vacationed in various locations around the United States and were getting sick while swimming in our water playgrounds. High levels of *E. coli*, streptococcus, and other bacteria were identified as the cause. The EPA was contacted, state and city water authorities were put to the task, and pathogen TMDLs were born.

During this time, we received a patent on our stormwater filter device called the ClearWater BMP. Designed to fit in sidewalk curb inlets and grated storm drain systems, the multi-chambered ClearWater BMP is a true filter system. Pollutants of concern can be targeted by changing out the filter media to fit TMDL needs.



Testing of the pathogen media

Because our stormwater filter unit can be tailored to different TMDL needs, we have had to keep up with many kinds of filter media and their abilities to remove all sorts of contaminants. These contaminants range from copper, lead, zinc, oil, and phosphates to the large family of pathogens. Some examples of media that are used in combating these pollutants are granulated activated carbon (GAC), zeolites, perlite, and other proprietary media blends. We have researched and used many of these different types of media and have come to realize that some of these media work well and others don't work at all.

Prior to our hunt to locate an effective pathogen filter media for the ClearWater BMP, we established a set of four simple rules that the chosen product would have to adhere to. If the product passed all of our rules but one, it was rejected! The rules read like this:

- The filter media must have good water flow capabilities (15 gallons per minute per square foot).
- The filter media must have a good shelf life while in our unit (6 months-plus).
- The filter media must not damage downstream aquatic life (required toxicity tests).
- The filter media must eliminate a high number of pathogens (85%-plus elimination).

We began by evaluating, and testing touted pathogen media against our four simple rules.

Some products appeared to have good pathogen elimination rates but were very unpractical due to the large amount of contact time needed to achieve those rates. Stormwater is always on the move, so limited contact time is a must!

Another problem that we ran into was the fact that some products worked well during the first part of a storm but became quickly useless. We water-tested a well-touted stormwater bacteria media that quickly clogged with very fine sediment and slowed the water coming through the media in the ClearWater BMP to one quarter of its normal capacity. This pathogen media is lightly

molded to fit its surroundings. When sediment was introduced to the water column, the front of the molded media filter rapidly clogged. We needed a pathogen media that would allow good flow-through characteristics.

Toxicity of pathogen-destroying media to downstream aquatic life was also a big concern of ours. Iodine is a good example of this. It is very effective at taking care of bacteria, but it can also be highly toxic to downstream aquatic life if not properly controlled.



Samples taken during testing

During our research, we approached a company called AS Filtration and asked to field-test its pathogen media called Pathex. We had chanced upon some lab results that showed excellent pathogen media performance under very good flow rates. Lab tests were showing a 99% plus elimination rate for incoming colonies of E. coli. This piqued our interest, and AS Filtration agreed to the tests. During this time, we were just getting ready to start a round of field testing for the ClearWater BMP for the City of Los Angeles, CA. Engineers for Los Angeles agreed to the addition of the Pathex media, and several rounds of testing ensued.

University of California – Los Angeles doctoral engineering students collected influent and effluent samples to be sent to Los Angeles' Hyperion Lab for testing. An independent laboratory also collected samples to help confirm the data.

As you can imagine, we eagerly awaited the results. We hoped that the field tests would help to confirm the lab tests that we had seen. We finally received the call that we had been waiting for. Seven out of eight tests showed that E. coli elimination rates were 98% or better with excellent continual flow rates and no downstream degradation of aquatic life. At that point, we realized that this was the pathogen-destroying media that we had been looking for. It passed our four simple rules, and now pathogen TMDLs could be properly addressed.

Since that time, both Clearwater Solutions and AqueShield have signed agreements with AS Filtration to be the exclusive worldwide distributors for the Pathex media. Pathogen TMDLs are the bane of stormwater managers, and the more tools that they have to take care of their problems, the easier it is for them to do their job. Pathex is one quality tool that can help solve the pathogen TMDL issue.

Topics: [Bacterial detection](#), [Pollutants](#), [BMP Manufactured](#)