

April 2017

The Wastewater Insight



Unpredictable weather can impact your plant. What are some of the problems weather can cause?

Weather is unpredictable. Extreme cold or high temperatures, excessive rain, hurricanes, blizzards or drought can all impact the conditions of a wastewater treatment plant. What are some of the effects and some of the things you can do to combat these types of problems?

Obviously, most plants are designed with these issues considered. Many plants have spare EQ tanks, holding tanks, diversion ponds, heater or heat exchangers for just such occasions. Some plants do not and are stuck running around trying to jury rig whatever they can to limp through the sudden weather changes that can impact their plant. Heavy rain can wash oils off streets, parking lots, industrial facilities lots. And where does the stormwater go loaded with oils, dirt and debris?

Many times it can wind up in the wastewater treatment plant either directly or through infiltration. Oils in the lift stations or collections systems can cause heavy biological growth, and not always a good kind!!!

Zooglea, fungi and filaments easily can grow in the collection systems with heavy loading. This can cause blockages, odors or just impact the treatment plant downstream.



Excessive rain can cause hydraulic washout. This can impact many different parts of a plant.

Heavy rains can cause numerous issues just in a lift station for municipalities. Rain on the roads where construction occurs can wash off high levels of oils that cars drip while stuck in traffic waiting for lights to change. This can cause foaming due to Nocardia and Microthrix, which thrive on excessive oils and grease. Rain also can cause huge chunks of grease to dislodge in sewer lines and lift stations to make its way down to the primaries of a wastewater treatment plant.

Check your primaries, if you have the skimmers that need to be adjusted by hand, make sure you do it more often after high rains to pull out as much grease as possible. Definitely, make sure someone comes in on the weekend if you only normally run 5 days a week to pull the grease off the primaries. Many plants overlook this and build up too much grease on the weekends and come in to the plants on Mondays with many problems.



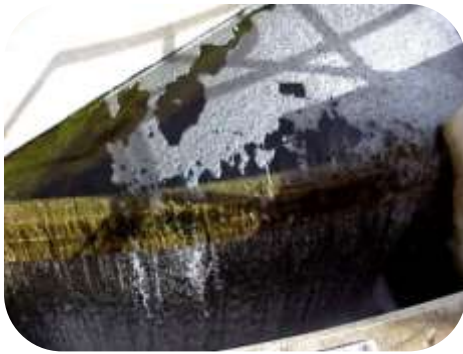
We started this month out with a new **Mystery Bug of the month!**

Check out our website for more photos of our new mystery bug!!!!

EnvironmentalLeverage.com



Hydraulic washout can cause problems in the primaries as well as the aeration basins. Washing out too much of the MLSS from the aeration basin as well as the clarifiers can make your biomass younger. While the carbonaceous bacteria can recover relatively quickly, the nitrifiers, if washed out, will take quite a while to rebuild up a significant amount of numbers capable to handle the plants influent. Waste less if this happens, and try to return more recycle if possible.



If you have a once through lagoon, you can reseed with bioaugmentation cultures. Bioaugmentation cultures may be the carbonaceous bacteria, or nitrifiers, if really necessary.

Check nutrient levels with excess grease or oils in the influent, especially if you are a municipality. Sometimes the excess loading can cause foaming and zooglea. Decant from your digester if you need a little more nutrients instead of adding extra nutrients from a bag. You have your own source on hand. Also if adding ferric or alum, maybe after high rains and extra grease, you need to cut back slightly to make sure not to actually cause nutrient deficiency.

High rains, hurricanes or flooding can cause clarifiers to washout easier than many of the other parts in the system. This can cause the beds to rise and float out over the edge of the clarifier, losing a critical amount of your MLSS.



Some plants have an EQ tank, a diversion tank, or empty aeration basins or clarifiers that they can divert some of the excess flow during high rains in order to bleed some of the water back into the system after the high rains have stopped. This is the best case scenario and allows the plant time to recover from the heavy rains, without causing any washout or loss of MLSS and efficiency of the plant. Some plants are not allowed this luxury.

Municipalities and some food plants that have to disinfect prior to discharge are significantly impacted by high rains and hydraulic overload. If the flows are too high and run too fast through the systems, especially if they have UV or ozone, they might have a hard time meeting permit levels.



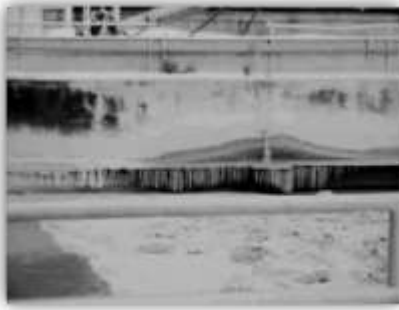
A typical 3-4 MGD plant can sometimes get as high as 10-15 MGD flow with very heavy rains! That is incredibly hard on a biological plant to handle.

Droughts or fires on the other hand can cause problems to the opposite extreme. Dry weather for municipalities can tend to cause the flows to go lower, the MLSS to get significantly older and filaments sometimes can dominate due to longer MCRT and lower F/M ratios. When this happens, adjust your bed levels in your clarifier, lower your MLSS according to your microscopic evaluation. If you typically run at a medium age sludge and stalked ciliates and a few rotifers are dominant, but suddenly you only have rotifers and many worms, you know you are too old and need to increase wasting.



Fires can cause additional problems, especially if inside the plant such as an industrial site, or a fire in a city and the water from a house burning is flushed down the drains. The chemicals in the water may be harsh, impact the pH and alkalinity in the system, they may have significantly higher BOD levels and need an adjustment to the MLSS. There may be foaming chemicals that were used and this may cause foaming in the aeration basins. There may be toxic chemicals to the biomass or specifically the nitrifiers.

Watch your system carefully after a fire; run more tests, check your nutrients if the incoming stream is higher in BOD. Look under the microscope at the bacteria, they will tell you what is going on long before it becomes critical.



Cold weather extremes can significantly impact a wastewater treatment plant. Did you know that for every 10° in temperature that the MLSS drops, the activity of the biomass changes one logs growth!!! Obviously, that means if the temperature drops below 70° or 60° F, you will have to increase your MLSS. If it gets really cold, you may need to carry a MLSS and have a higher bed in your clarifier 2-3 times what you do in the summer months.

Oxidation ditches have many problems in the winter months due to the fact that they have a larger surface area. Also, they don't have the benefits of some activated sludge plants that have mechanical mixers that do generate some heat.

Microthrix loves cold weather, and many ditches seem to grow a significant amount of filaments in the winter.

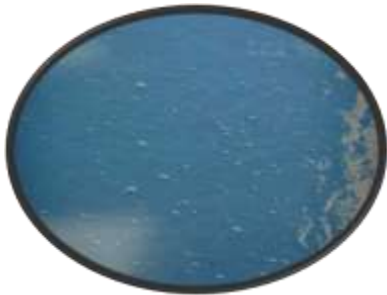
Watch all the variables at the plant and you can work around these issues.

Lagoons and once through systems have a significant disadvantage also in the winter months. They cannot increase their RAS, so they are limited on their ability to degrade BOD. Remember that it is always a time and numbers game in a biological system. How much time you have is limited by the size of the equipment. You can only play with the numbers to adjust to changes in the incoming BOD values. Luckily, lagoons can use bioaugmentation during the winter months and still beat the game.



Extremely high temperatures can cause problems also. The higher the temperature, oxygen transfer changes.

Even though activity increases, DO levels seem to drop off in the summer. Filaments and algae tend to increase in the summer. Gassing and denitrification can increase also. Adjust your bed levels in your clarifier, increase wasting if necessary. Some industrial facilities even need to install heat exchangers, especially papermills. If you start to climb over 100°F, you will still get BOD degradation, as long as it is a steady temperature range. If your plant tends to jump around higher and lower in temperature, your biomass may start to get temperamental. Any time you make more than a 10% change, it is major to the bacteria. Try to keep that in mind when making any adjustments. Some plants consistently run from 115-120 °F. These plants will get some BOD degradation, but will have poor floc formation, high TSS levels and have to watch their permits for TSS. Polymer consumption will probably increase also.



Always keep in mind the Critical 5 plus one: Temperature, pH, Ammonia, o-phosphate, Dissolved Oxygen and Alkalinity.

Check and adjust if necessary upstream, in the secondary and downstream. Check out our troubleshooting issues on each of these as well.



Contact Environmental Leverage Inc. if you need help with your plant on some of these issues!!

Upcoming training classes

We are just about to start scheduling our Hands-on Classes for 2017.

We have had too many private onsite classes and audits. Stay tuned to our monthly newsletter where we will announce them as they are set up. They will also be posted on both our Websites.

If you would like to host a class at your facility, please contact our offices.



New Training development- Check out our new wastewater ELearning classroom.

Now you can take classes from the comfort of your own office. Online classes save money, travel time and expenses as well as the fact that you can learn at your own pace. You can go ahead and set up a free account and take the few virtual demo. Then you are ready to choose your classes from our list currently or as the new ones come up and go online. We already rolled out the first set of training classes. Stay tuned for more information on upcoming classes. . . .

We will continually be adding new courses to the ELearning. Let us know if you have a special topic you would like to see covered.



<https://www.wastewaterelearning.com/elearning/index.php>

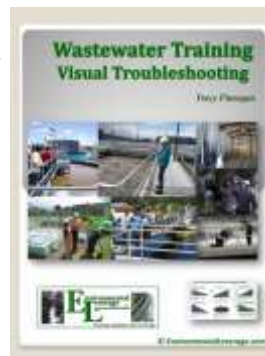
These courses have been pre-approved for Wastewater CEU's in Alaska, California, Connecticut, Indiana, Maine, Nevada, New York, North Carolina, Vermont and Washington. Some states do not require pre-approval. If you need these approved for your state, please contact our office.

These courses are eligible for CEU's, Contact Hours or PDH (Professional development hour) in Alabama, Arizona, Maryland, Virginia and more to come. Now approved in Canada for Nova Scotia.

New release February 2017 and updated classes just added.

Coming soon, Nitrification/Denitrification and Clarifier

Filamentous ID the Easy Way in the Fall



Yep it's moving

Did you guess what this was? This is **Beggiatoa** It is the only motile filament. Usually it is found in septic conditions. Often found on trickling filters, and RBC or media units when biomass builds up.

[March 2017- Beggiatoa](#)

Check out our website for more photos of our new mystery bug!!!!

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