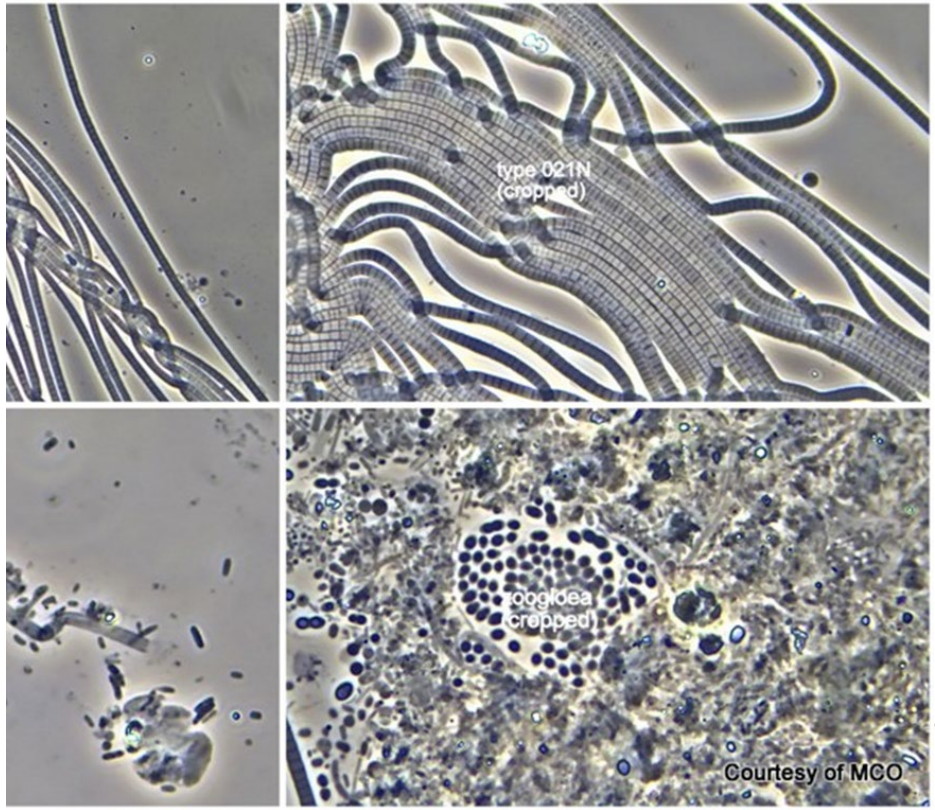
City of Benicia WWTP

In-House Treatment Optimization for Nutrient Reduction – The Journey so Far

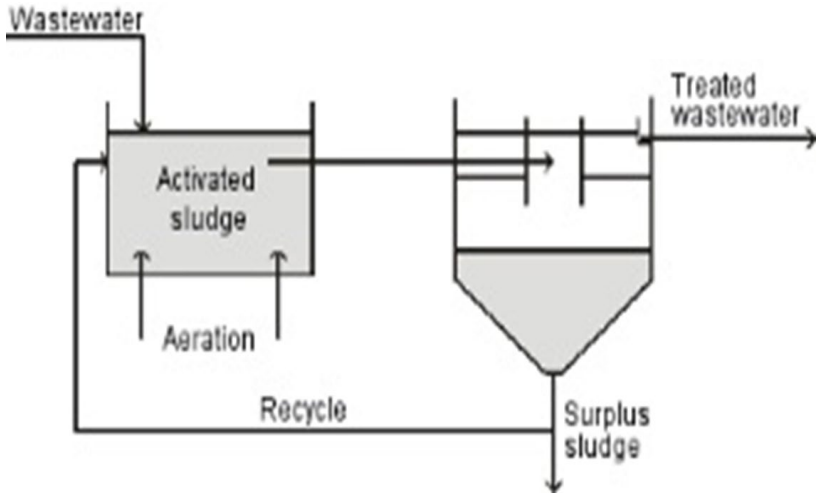
It all started with a happy accident that wouldn't realize its potential at first.

- Difficulty controlling filamentous bacteria.
- Predominant species: Type 021N Thiothrix, and Flexibacter (associated with organic acids, and fatty acids).
- Set an F/M value to control filaments.
- Immediate nitrification that the treatment plant and operators were not prepared to deal with.



Then, an unpleasant surprise.

- When the first RFI from BACWA was released for completing the first Group Annual Report, it was the first that Benicia realized the urgency of the new regional nutrient order, so we started behind many others.
- Issued an RFP to gain the help of a consultant for a nutrient reduction alternatives assessment.
- Decided to attempt in-house optimization to see what that would yield.

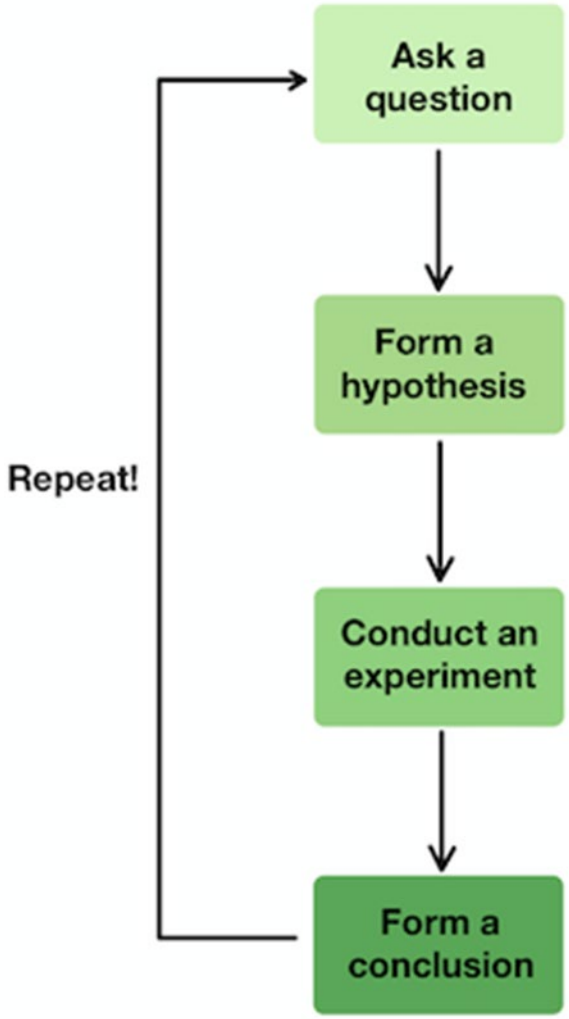


Optimizing for Nutrient Reduction

- Set a similar F/M value to filament control.
- BOD estimated by COD.
- Even out daily loading rates.
- Estimate TIN values by TNT.
- pH monitoring for process control.
- Probe readings for quicker MLSS values.
- Rolling averages of all pertinent values used in calculations.

Necessary Adjustments Along the Way

- RAS pump control adjustments.
- Ferric Chloride as a process health supplement.
- Creation of a nominally anoxic zone.
- Adjustments to the DO setpoint.
- Adjustments to find the optimal F/M value.



Challenges Not Yet Overcome

- Rainfall of almost any amount hinders nutrient removal.
- Significant rainfall requires for the plant to come completely out of BNR mode.
- Treatment has leveled off for now at what calculates to an expected average of 130-140 Kg/Day.

Where do we go from here?

- The TIN reduction alternatives analysis has just begun.
- We will continue our efforts to drive down Inorganic Nitrogen levels in-house.
- With the chosen consultant, we will review alternatives for higher levels of treatment.

Questions?

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