# The Ocean's Friend: Biofloc in Action

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# TOF Aquaculture

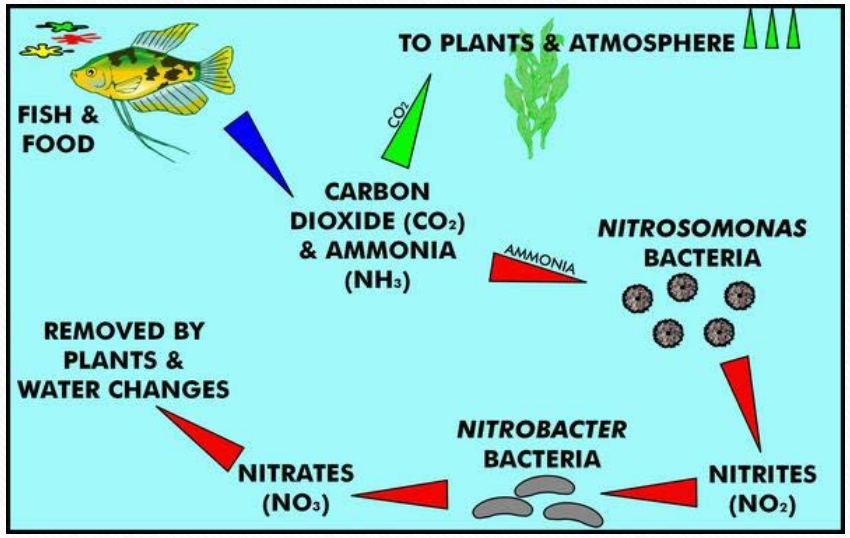
- Founded in June 2015 in Gratiot [Gray-shot], Ohio (Zanesville)
- Young aquaculture farm focused on marine species
- 1st Saltwater Shrimp Farm in Ohio (according to ODNR)
- Currently has 14,000 sf of production space
- 18 grow-out, 3 intermediate, 2 nursery tanks
- Harvest 4-5 tanks per month, 970-1120 lbs of shrimp
- Initial stages of producing Aussie Red-Claw, sea asparagus, and Florida Pompano

# “What Are You Doing?”

- Wanted to be a marine biologist, but parents said NO!
- Researched @ USC Wrigley Center off Catalina Island on microbial metabolism
- Intrigued by how dynamic bacteria are and ran into shrimp farming
- Once I graduated in May 2015, and found a steady engineering job, I went all-in!
- And here I am!

# Marine Shrimp & Biofloc Symbiosis

- Biofloc are congregates of mostly heterotrophic bacteria (11 million microbes/ mL of solution)
- 2-20% actual bacteria, 60-70% organic matter
- Feed on organic substances and waste
- Acts as dynamic biofilters in tanks
- Up to 1/3 of shrimp food source

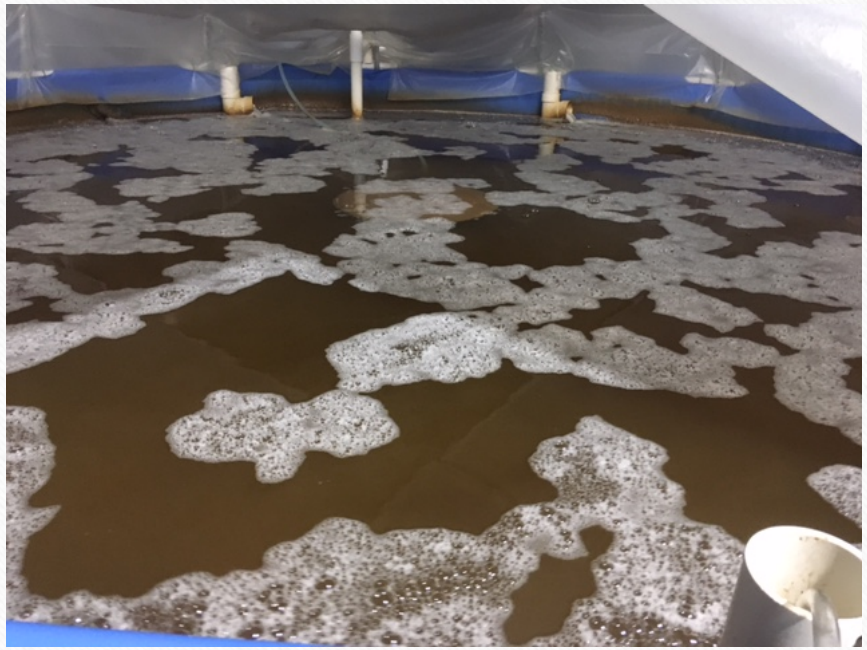


# What Do You See?

- A complex, but reasonably comprehensible system

**Table 1.** Marine shrimp water quality parameters. From Pli´nio et al. (2014), Ray et al. (2014), Samocha et al. (2010) and Yong-Chin et al. (2003).

| Parameter | Amount | Recommendation |
|---|---|---|
| Temperature | 28˚C | Lower temperatures have slower growth; too high temperatures cause stress. |
| Salinity | 10+ g/l | Tolerant of 4-35 g/l. Higher salinity helps buffer other WQ parameters. |
| Oxygen | 5+ mg/l | 5 mg/l to saturation reduces stress on individuals. |
| Alkalinity | 160 mg/l+ | Moderates swings in pH. |
| pH | 7.5 | Preferably above 7.0. Tied to alkalinity. |
| Un-Ionized Ammonia | 0.03 mg/l | Toxic form of ammonia. Percentage of total ammonia changes with pH, alkalinity/salinity and temperature. |
| Nitrite | ≤5-25mg/l | Limits rise with increasing salinity 15-35 g/l. |
| Nitrate | ≤150 mg/l | Higher levels increase stress and result in poor growth. |
| Total Suspended Solids (TSS) | 400-500 mg/l | Too little causes poor production; too much causes gill irritation. |
| Suspended Solids (SS) | 10-14 mg/l | Too much may result in anaerobic potential. |



# Is Biofloc a "Perfect" System?

## Advantages

- Boosts Feed Conversion Ratio
- Less Mechanical Maintenance
- Cost-Effective
- Higher Survival Rates (Mostly)
- Faster Growth Rates (Theoretically)
- Quick Ammonia/Smell Control
- Good Mistakes & Disease Buffer

## Disadvantages

- Daily Testing Required
- Visually-Impaired
- Limited in Species Flexibility (Thus Far)
- Quick Mortality W/O Mutual Host
- Constant Suspension
- Able to Tip Dissolved Oxygen Scale

# Things Biofloc Cannot Do

- Help with metals accumulation
- Come back to life
- Fight off  Algae/Autotrophic Bacteria effectively
- Produce own carbon source, must be supplied

# Shrimp and Biofloc Interaction

- Shrimp consume it as a significant food source
- Shrimp are “advanced biofloc farmers”
- Biofloc can act as bandages?
- One is happy to eat the other while the other is happy until it’s for dinner!

# Future of the System

- Species Diversification
- Better Understanding/Knowledge
- More Precise Manipulation
- Methods to Speed Up Growth
- Continued Expansion of US Aquaculture

# Why Are Shrimp Farms Closing?

- NOT Biofloc's Fault
- Unrealistic Expectations
- Marketing Issues
- Subpar Planning
- Financial Problems
- Lack of Knowledge
- Too Big, Too Fast, Too Many Hands in the Pot

## Florida Organic Aquaculture seeks buyer

By Cliff White
Published on August 1, 2017

SHARE


The owners of Florida Organic Aquaculture LLC are considering a sale of the company in order to raise more capital to fund its operations.

The Fellsmere, Florida-based firm has retained Equity Partners HG to seek an investor, partner or buyer for its "state- of- the-art, technology-driven shrimp farming operation."

"This is an excellent opportunity to invest in or purchase a state-of-the-art shrimp farming operation with infrastructure in place to quickly expand as needed," Equity Partners HG Managing Director Hank Waida said.

FRESH MARKET SHRIMP
By The New Mexico Shrimp Company

HOME EQUIPMENT FOR SALE

# Tips for Success in Aquaculture

- Reach out to other farmers already producing your species of choice
- Listen & learn, but experiment & see for yourself as well
- It is not a get-rich scheme, it takes a lot of hard work
- Plan, Revise, Revise, Revise Again
- Work Hard and Have Fun!

Questions/Comments/Concerns?

Thank You!

The Ocean's Friend
AQUACULTURE