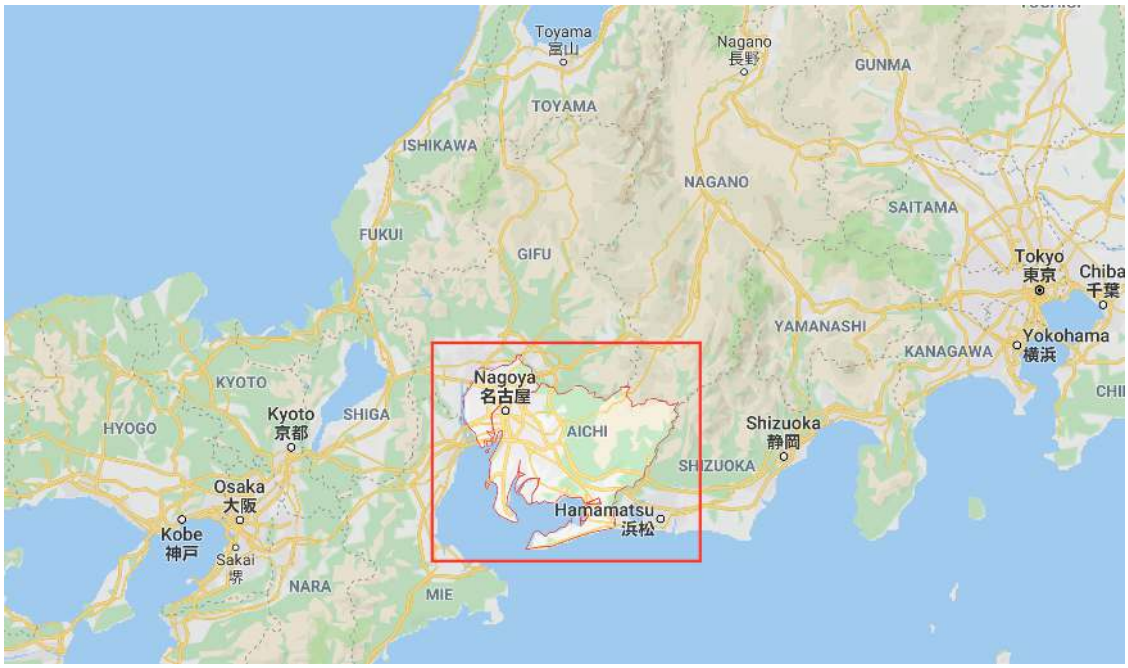
AichiEnvironmental Award 2019
Won by NagasakaEelFarmusingAnzai Nanobubbles
CaseStudyHighlights

Aichi is a Japaneseprefecture in central Honshu Islandand anarea known as a top producer forfarmedeel.Eel is avery popularfoodin Japan,with the high eating seasonin the summer months.In2015, inordertoincrease productivityandreduceenergycosts, NagasakaYouman(NagasakaEelFarm)in Nishio City,engaged AnzaiKantetsuto install its patentedNanobubble technology.



Oneof the biggest problems facing theeel farmingindustry is lossof stock, or ‘farming loss’. Farmingloss is generally made up of a combination of mortality andundersized stock. From the eelsthat survive, around70%reachaweight suitable for market,leaving30%too small for sale. This undersized stock is usually disposed ofby farmersbecause it can take up to fourmoreyears for these smaller eelsto grow to market sizeand only then with the assistanceof growthhormone chemicals.

NagasakaYouman'sbusinessisunusual becauseit is a farm thatcollectsthese undersized eels from around 300 other eel farms, and over the following years nurturesthem to a size where they can be sold.

Historically,the farmoperateda systemthat continuouslypulledlocalseawaterinto the facilityand then dischargeditto keep the eel tank water clean.Eelsare more oily than other fish, so oil from their bodiesfilledthe waterbeingdischargedandcausedfrequentfilter blockagesin the system, resulting in constant maintenance.

Aseelsprefer to live in warm water,the tank wateralsoneeds to be warmed by oil powered heaters, so the constant dischargeofoilywaterwas inefficient, costly andbadfor the environment.

Thefirstimprovementwas the introduction of an RAS(RecirculatedAquaculture System) that stopstheneed todischarge. However,this systemrequires a method of cleaningthe waterbefore/as it is recirculated.Thesolutiontothischallengewasto useAnzai's Nanobubbletechnologykeepsthewaterrich inoxygen,cleanand eradicatestheneed for a protein skimmer.

The NagasakaEel Farm facility

Theusualfarming cycle/periodto bringeelsto marketisaround ten months.Forundersized eels, itcantake up to four years.After the introduction of Anzai'sNanobubbles,the ordinaryeelswere of a marketable sizeinonly four monthsand the undersizedeelsgrew to market sizein ten months. What's more, there was also a reduction on feed costs.

Beforethe introduction of Anzai'sNanobubbles, Nagasaka'sfarming loss was 17%. This was made upof 11%mortality and 6%of the eels being too small for market. Once Anzai's Nanobubblesystemwasfullyoperational, the mortality rate reducedfrom11%to 6%and the under-sizedstock reducedfrom 6%to2%giving an overall breeding lossreduction from 17%to 8%, an improvement of almost 53%.

What is even more impressive is that this was achieved at the same time as an increase in the bio mass (density/breeding numbers) in the tanks which is now five times greater than previously farmed.

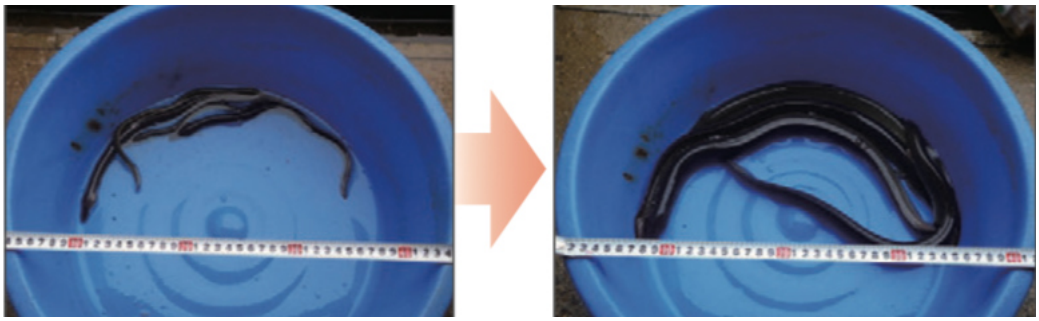
Anzai 100 A/S In-Line Nanobubble Unit

The Nanobubble unit used for this project was the 100 A/S In-Line Nanobubble generator which delivers 20 litres of gas per minute with a water flow of up to 1.5m3 per minute.

In addition to the increase in the number of eels being produced and the health and quality of the stock, the other main objective of introducing Anzai's Nanobubble technology was to reduce costs.

On this front, savings made on heating the water were the equivalent of 350,000 litres of heavy oil per year resulting in a saving of 28,000,000 Japanese yen (around US$250,000 or £200,000). Savings on the emissions of CO_2 was around 950 tons over the same period.

This means that for each eel there was a savings of 80% of the heavy oil price and 25% of the electricity costs.



Undersized eels grow to market size in standard time without the use of chemicals.

Conclusion:

NagasakaYoumanwontheAichi Environmental Award 2019, usingAnzai Kantetsu'sNanobubbleTechnology,whichachievedthe following headline results:-

- BreedingDensity= 5 timeshigher
- Fuel Costs = 80%less(per eel)
- ElectricityCosts= 25%less(pereel)
- BreedingLosses= (-17%)to (-8%)reducedby 53%
- Sedimentation =75% less

An environmental and commercial successonevery level!

IMPORTANTNOTE:-Anzai'sNanobubbletechnologyisnowmaking animpact acrossalarge numberofindustries and applications andwinning awards.This is becauseithas been meticulouslyand rigorouslydevelopedandrefined,overa period often years,both in operational applicationsand trialswithindustry,universities, independentlaboratoriesand Governmentdepartments,all of whichprovidesa solidscientificbasisfor useof this particular method of producing Nanobubbles,inAquaculture,Water Remediation,Farming andnumerousareasof mining and heavyindustry.