Pioneering fish farmer to give presentation on plans for offshore Atlantic striped bass farm

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Donna Lanzetta, Founder of Manna Fish Farms, will give an in-depth presentation on her long held belief that offshore is the place to farm and on her five year venture to gain the necessary permissions

In November 2015, Lanzetta had an important meeting with the U.S. Army Corps of Engineers, that meeting put her on track to secure the needed permits to ultimately put fish in the water, pending the completion of pre-site studies and other related paperwork.

The U.S. Coast Guard, the National Oceanic and Atmospheric Administration (NOAA) and New York's fisheries management and environmental conservation departments have also all been involved in the process. Lanzetta feels all associated are hopeful for the integrated multitrophic farm's success (Manna plans to grow scallops, kelp and mussels as well). But to satisfy the concerns of all agencies and other interests, the operating site for Manna had to be moved from three miles offshore to six — and then again to 16.2 miles from the coastline of Hampton Bays, New York, USA.

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Barcelona Offshore Mariculture Conference

Donna Lanzetta, Manna Fish Farms, Inc.

Title: OFFSHORE MARICULTURE - WHERE AND WHY?

"We must plant the sea and herd its animals using the sea as farmers instead of hunters. That is what civilization is all about --- farming replacing hunting."
Jacque Yves Cousteau, 1971

Introduction

As human populations continue to increase, it is now clearly recognized that global seafood consumption and demand will grow markedly in the next several decades (Duarte et al. 2009, FAO 2014). Seafood products are one of the most nutritionally beneficial food sources available for humanity, providing an array of vital micronutrients and fatty acids that encourage healthy diets (Tacon et al. 2015). Since wild fisheries production has been largely stagnant or in decline in the last few decades (Pauly & Zeller 2016), aquaculture has emerged as the future of seafood production (Duarte et al. 2009, FAO 2014). In addition, aquaculture has many benifits compared to terrestrial animal protein production. For instance, in terms of their greenhouse gas emissions(Nijdam et al. 2012) and freshwater footprints (Gephart et al. 2014, Troell et al. 2014), seafood products are comparable or better than most land based animal proteins production systems.

Globally, the majority of aquaculture production currently occurs in Asia and this production is largely restricted to coastal areas (FAO 2014). Although Kapetsky et al. (2013) recently found that of the 93 countries with active mariculture, over 50% only produced less than 1 ton per kilometer of coastline per year, realistically the room for development in coastal areas is quite finite. This is due largely to a variety of stakeholders in coastal areas, including tourism, fisheries, energy production, trade, and other uses. Finding the space necessary for responsible aquaculture expansion has been of great interest to many researchers, and has led to a move for offshore aquaculture (Marra 2005, Duarte et al. 2009, Sanchez-Jerez et al. 2016).

Although the United States remains a major seafood consumer globally, the vast majority of aquaculture production continues to occur outside of its waters (FAO 2014). This glaring lack of development is despite several acts by the US government to increase US aquaculture activities that have passed decades ago (e.g. National Aquaculture Act of 1980). So, how is it that the FAO ranked the US #1 in the world for the largest potential area for offshore aquaculture production (Kapetsky et al. 2013), yet there has been so little

development. Chu and Tudur (2014) report that there are many factors that have contributed to this lack of development in the United States, including a murky permitting process and economic disincentives for entrepreneurs. However, the tides may be changing.

This presentation will provide an account of my ongoing journey to create the US's first commercial offshore multitrophic fish farm. It will highlight the major bumps. bruises, and challenges that have come along the way, as well as the great opportunities that have emerged. To me, this is not only a commercial venture, but a necessary vehicle to help resuscitate US seafood production, and to provide economic revitalization to my local community, which is home of the second largest commercial fishing fleet in New York State.

Setting the record straight

Public perception of offshore mariculture in the western hemisphere has been severely impacted by the growing pains of the coastal farming industry in the preceding decades. The record of deleterious environmental impacts of coastal fish farming has largely created a cloud over the industry that is now etched in many consumers' minds, regardless of the tremendous gains in coastal farming that has been accomplished since. In addition, coastal fish farms are increasingly competing for space on our coastlines with other stakeholders. So, how do we continue to raise fish on an increasingly finite coastline? The answer lies compellingly in moving our farming offshore, to deeper, faster waters, where farming has been found to have a negligible environmental impact (Holmer 2010, Price & Morris 2013, Rust et al. 2014).

Open ocean aquaculture occurs in waters that are far enough away from the coast so as not to conflict with other coastal activities. Location is selected with various considerations in mind such as depth, bottom topography, benthos, water temperatures, endangered species, currents, navigational channels and, do not forget the migratory routes of the wild species, as well as the accessibility to commercial markets. Site selections will vary depending upon the equipment being utilized and other site specific considerations.

There are several benefits to offshore farming which make it different from coastal farming. For instance, open ocean farming is conducted in exposed waters with greater depths than the coastal area. This allows for substantially less environmental impact to the benthos, water column, and wild species (Holmer 2010, Price & Morris 2013, Rust et al. 2014). While these result are encouraging, it is important to note that there are only a handful of studies to draw from, due to the limited operating offshore fish farms worldwide. Therefore, in order to collect more data to discern the potential impacts of offshore aquaculture, we need to have

operating farms to study (Holmer 2010). Manna Fish Farms takes our leadership role in this very seriously and we will have our water quality monitoring conducted by a third party and we will be 100% transparent in this process, with our data publically accessible. This data is essential to help drive development of the offshore mariculture industry in the US and around the world.

Manna Fish Farms has been born from Passion, and passion is imperative if one is to move forward in these unchartered waters.

It takes what I like to call, the "three P's", Passion, Partnerships and Perseverance.

Passion

For me, my passion stems from a lifelong love of the sea and seafood, and from what I view as an absolute necessity for our survival and for the health of our population, driven by our great need for healthy protein for consumption in the US. We are currently importing 91% of our seafood - a travesty, with seafood being our second largest natural resource trade deficit, second only to oil. We know that, even if the world's wild fisheries are optimally managed, we still must increase farmed production of seafood by 50% by 2030, if we are to meet the future protein demands of our growing population (Duarte et al. 2009, FAO 2014). Our coastlines, bays and estuaries are simply unable to absorb more activity, consequently, we **MUST** explore ocean mariculture.

Partnerships

That said, all the passion in the world won't get you very far without expertise and partnerships - partnerships that are imperative to accomplish this formidable task. Manna used a multipronged strategy to engage stakeholders and the public to foster partnerships. We enlisted the support of our local government, the Town Supervisor, Town Board and Town Trustees. We expanded to bring in support from our County Legislator, State Senators, State Assemblymen and women, and our Congressional Representatives. Importantly, there has been an outpouring of support and not been one refusal of assistance - the case for ocean mariculture is that compelling.

With political support established, we turned to our educational institutions, and are thankful for the benefit of drawing upon the scientific expertise and advice of Dr. Chris Gobler, of SUNY Stony Brook School of Marine and Atmospheric Science - (SoMAS), and of Dr. Michael Chambers of the University of New Hampshire (UNH). UNH has gone a step further, and we are

thankful to be utilizing their automated feed buoy during the first two (2) phases of our development. Coordinating these efforts is our Director of Research and Development, Dr. Konstantine Rountos of St. Joseph's College. We are forging new partnerships every week, with our most recent affiliations including discussions with The Nature Conservancy and Chefs for Oceans, among others. In addition, we have forged a partnership with two local striped bass hatcheries to source our fingerlings. A local, reliable source of healthy fingerlings is a must , and another important consideration in site selection.

Perseverance

At last, we come to perseverance, which is the very mortar of any successful initiative. In the case of Manna Fish Farms, we persevere and continue to navigate the labyrinth of US ocean policy and its many issues, permits, and agencies. One might think that the permitting process should be relatively straightforward considering that the US has had legislation supporting the sustainable development of ocean aquaculture for several decades now. But it is clear from the glaring lack of development of the US aquaculture industry, that this is not the case. This point is further emphasized by a recent study that found that the majority of US fish farmers intend to look to expand their future operations outside of US waters, rather than deal with the murky and lengthy permitting process domestically (Chu & Tudur 2014). From our perspective, the experience has been largely discouraging, but we remain optimistic, especially with the recent launch of the Gulf of Mexico Aquaculture Plan. This plan should help pave the way for a more streamlined permitting process and foster a productive US offshore aquaculture industry.

Location and operation

Manna Fish Farms will be located roughly 26 km (16 miles) south of the East End of Long Island (Figure 1). The site selection process must balance the proximity to our port, and consider the necessary depths, current velocities, and vessel traffic. In fact, an analysis of vessel automatic information systems data monitors revealed that our site is not along a major shipping route, as only a handful of vessels annually approached within 1 km of the site.

In order to farm fish this far out, we will be utilizing the patented Aquapod technology, which is designed to handle the rigors of offshore farming sites (Figure 2). These geodesic spheres are truly remarkable and they have a variety of benefits as compared to conventional coastal net pens, including being rigorously tested in harsh offshore conditions and being submersible. Our Aquapods will be **21 meters (70 feet) in diameter**, and **capable of holding**

63.5 metric tons (140,000 pounds) of seafood. We will start and perfect the ocean farming of wild Striped Bass (*Morone saxitalis*), and we plan to subsequently incorporate other finfish, shellfish and macroalgae, as we work to become a fully multitrophic operation. Our development plan is for a four phase build out, starting in Phase I with one Aquapod as our proof of concept model. We are currently establishing our monitoring and collection of data on water quality and benthic characteristics at the proposed site, which will be located roughly 16 miles (26 kilometers), south of Long Island New York, out of Shinnecock Inlet in Hampton Bays. . Monitoring includes conducting bathymetric surveys, deploying water quality sondes, and accessing the abundance and diversity of the planktonic and benthic communities. Establishing a clear baseline is imperative and mandated before we can begin our operations. We will continue our monitoring work throughout our operation, and this data will be freely available via our web site. After successful completion of our Phase One proof of concept, we will enter Phase II, during which time we will operate four (4) pods, then Phase III, which will see twelve (12) pods in operation, and ultimately Phase IV, with 24 operating Aquapods.

Transparent monitoring is a necessary step for the future expansion of the offshore mariculture industry, as we are currently limited to a few studies due to the handful of offshore farms in operation (Holmer 2010, Price & Morris 2013). This is why we are working in collaboration with various academic institutions for our monitoring work. This research collaboration is not only constrained to monitoring, as we also plan to explore the utilization of locally sourced alternate feed components to further minimize our impact on the environment. We are excited to be able to contribute to the growing body of science surrounding offshore mariculture.

Conclusion

Manna Fish Farms is primed to take a leadership role in ushering in offshore mariculture development in the US. We will work to guide the Where and Why of this developing industry. Globally, however, there are over 100 countries that have ocean areas with suitable current speeds, depths and proximities to ports (Kapetsky et al. 2013) for responsible offshore mariculture development. Over a decade ago, Marra (2005) asked a very important question, **"When will we tame the oceans?"** in the hopes of advancing offshore aquaculture production. It is our vision and plan, that in a decade from now, we will be making it happen around the world, in an environmentally responsible way. We must all work together to accomplish this goal. Thank you.

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Figure 1: Map of the approximate location of Manna Fish Farm, 26 km south of Shinnecock Inlet.

Figure 2: Image of an Aquapod.