Shellfish Culture Now and Tomorrow:
Charting a Course for Delaware Estuary Aquaculture

A Shellfish Panel Discussion on Science Priorities

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With a global human population of nearly 6.9 billion, demand for food is putting pressure on coastal and fishery resources worldwide. Global aquaculture production has been expanding and now accounts for half of world food fish and shellfish production and has the potential to fill the demand for marine and coastal fish resources, whilst helping to maintain coastal ecosystem functioning and resilience. Bivalves are an ideal crop animal because they feed on wild natural algae and are key ecosystem engineers. Their ecological role as hard substrate filter-feeders provides positive benefits to coastal systems, which are being increasingly threatened by sea level rise, eutrophication and shoreline erosion. Restoration efforts to enhance or replace these and other non-farm bivalve communities will increasingly rely on hatchery sources of new animals. These two efforts, ***aquaculture for food production and shellfish husbandry for restoration***, will work in concert in the years ahead to ensure local food security, shoreline protection, and a healthy estuary.

Panelists

Mike Deluca
Aquaculture Innovation Center
Rutgers University

John Ewart
Delaware Sea Grant

Danielle Kreeger
Partnership for the Delaware Estuary
Drexel University

Will Morey
Cape May County Freeholder

Barney Hollinger
Elder Point Oyster Company

Marc Zitter
Northern Cape Seafarms LLC

Monique Purcell
NJ Department of Agriculture

Today, the aquaculture sector in Delaware Estuary is small in comparison to neighboring states. However, the baywide industry is poised to expand, both in the scale of production, and the species being produced. More than ever, the industry is faced with key challenges in regulatory reform, user group interactions and research and development that will open the door for building into the future. Likewise, shellfish restoration is increasingly being considered as a means to mitigate climate change and sea level rise, and improve overall resilience of coastal ecosystems. As both farming and restoration efforts move forward in Delaware Bay, informed discussion is critical to insure purposeful development of both.

A panel discussion was held at the Delaware Estuary Science Summit in Cape May, New Jersey, on January 26th 2015. The conversation was an open forum that focused on the current status of these efforts in the Delaware Estuary, and more importantly, how best to support the development and growth in both sectors from a science and research standpoint. The following is a summary of the science priorities that were identified by both panelists and audience participants during the discussion.

Key research and science priorities identified:

Gear Innovation

Oyster farm production in the Delaware Estuary relies nearly exclusively on a single production system; intertidal bottom rack and bag culture. For farm production to grow and diversify, new gear types and grow out methods will need to be designed and tested. Surface gear in use elsewhere is ineffective in the Delaware Estuary, and advances need to be made in gear types that farms and restoration groups can use locally. This should specifically include examination of overwintering technologies, gear designs that limit fouling and gear that can withstand the uniquely damaging oceanographic conditions of the Estuary.

Increasing Production

Strong opportunity for increases in shellfish production and restoration in the Delaware Estuary exist; however, these gains are limited by access to financing, and prevailing policies and enforcement. Financial assistance, in the form of grants and loans are available, but there is a need to assist and educate farmers on what funding sources exist and how to access them. Legislative and regulatory reform has recently been initiated, but must continue be a top priority.

Vibrio & Human Health

As in any human food production system, concerns around food safety must always be paramount. Vibro, a naturally occurring marine bacteria that can contaminate shellfish, presents a complex issue for farmers both in terms of refining best management practices for handling product, and in defining appropriate regulations. Further research is required on this topic to build from ongoing efforts by farmers to take proactive measures to minimize risk. Priority should be placed on developing more efficient and possibly field-based methods for detecting pathogenic Vibro strains.

Hatchery Capacity and Independence

As it currently operates, aquaculture in the Delaware Estuary relies almost solely on a single source for seed production – the Rutgers University New Jersey Aquaculture Innovation Center. This reliance on a single source creates vulnerability for farmers in terms of supply limitation, control over seed timing and size, and redundancy in case of hatchery failures. Research and innovation efforts should focus on identifying new avenues for seed supply. This will be important in terms of farm business model stability, and in opening capacity for the research centers to focus on programs to support the unique needs of restoration efforts. Opportunities to initiate a local remote setting program should also be explored, as these would be of use to both farmers, and restoration programs (including fishery habitat enhancement).

Farm Model Diversification & Species Innovation

Through farm diversification and new species innovation, farms can expand food markets and directly help accomplish restoration goals. Certain species important for restoration projects could be produced on farms, or farms themselves could be used as mechanisms to meet nutrient mitigation or resiliency targets. These ideas around diversification sit at the intersection of aquaculture and restoration, and are an example of synergies that may be productive for both farms and restoration groups. This is a relatively new and unexplored area for the Delaware Estuary, and will require research support to begin exploring opportunities.

Adaptive Management

Climate change is already altering the way aquaculturists do business in the Delaware Estuary. The changes occurring in the ecosystem, resulting from sea level rise, increased storm frequency, temperature changes, and ocean acidification, all have the potential to alter how shellfish farms and restoration programs operate. Research should focus on how best to anticipate these changes and what their biological and business consequences might be, and how best to mitigate and adapt to these changes. Efforts should be made to assess changes via long term monitoring, and attention should be devoted to identifying adaptive management strategies to respond to changes.