



**PROCEEDINGS OF THE WORKSHOP**

**“FEASIBILITY OF SHELLFISH HATCHERIES  
IN EASTERN CANADA”**

Presented as a special session during the Scotian Pride Conference and Tradeshow held in Halifax, Nova Scotia, Canada on January 29-31, 2009

*Compiled by:*

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## LIST OF ATTENDEES

NAME	INSTITUTION
Aldous, Cory	NSDFA
Bertram, Doug	Innovative Fishery Products Inc.
Bertram, Scott	Innovative Fishery Products Inc.
Blinn, Marc	Innovative Fishery Products Inc.
Bradford, Brenda	ACOA
Carver, Claire	Carver Marine Consulting
Cook, David	Sweeney International Management Corp.
Couturier, Cyr	CAIA
Darnell, Peter	Indian Point Marine Farms
Dillon, Ronda	NRC-IRAP
Donnelly, Ken	Lura Consulting
Gionet, Chantal	Coastal Zones Research Inst, Inc
Graham, Artie	Mabou Hbr. Shellfish Producers Association
Green, Darrell	NL Aquaculture Industry Assoc
Hatcher, Bruce	Cape Breton University
Jackson, Tim	NRC-IRAP
Jones, David	Atlantic Hydroponics
Kingzett, Brian	Vancouver Island University
Landry, Thomas	DFO
Lavoie, Rene	N/A
LeBlanc, Angeline	Dept Fisheries and Oceans
MacDonald, Barry	DFO
MacDonald, Michael	Mabou Hbr. Shellfish Producers Association
MacInnis, James	Mabou Hbr. Shellfish Producers Association
MacInnis, Ryan	Mabou Hbr. Shellfish Producers Association
MacNeil, David	Mabou Hbr. Shellfish Producers Association
Mclsaac, Allison	Unama'ki Institute of Natural Resources
Methe, Denise	DFO
NS Fish and Aqua	NSDFA
Ouellette, Marc	Fisheries and Oceans Canada



<b>NAME</b>	<b>INSTITUTION</b>
Penny, Lorne	Fisheries and Oceans Canada
Purdy, Charles	Bay Enterprises
Rogers, Brian	Rogers Consulting Inc.
Sephton, Dawn	DFO Science
Sharp, Glenn	McGrath's Cove
Stewart, Stephen	Confederation Cove Mussel Co. Ltd
Stuart, Robin	Bounty Bay Shellfish
TeKamp, Mark	NSDFA
Theriault, Isabelle	Assoc des conchyliculteurs professionnels du Nouveau-Brunswick
Vercaemer, Benedikte	DFO Science
Warris, Peter	PEI Aquaculture Alliance
Webster, Cindy	Fisheries & Oceans Canada
Woyewoda, Andy	NRC-IRAP



## INTRODUCTION

On January 29-31<sup>st</sup> 2009, the AANS hosted its traditional Scotian Pride Conference and Tradeshow at the Lord Nelson Hotel in Halifax, Nova Scotia. This time, the conference included a one day workshop as part of the agenda. The need to review and discuss the feasibility of shellfish hatcheries in Eastern Canada arose from a series of meetings held with some of AANS members interested in writing project proposals on development of hatcheries. In those meetings it was recognized that the shellfish aquaculture industry in Eastern Canada is highly dependent on the collection of wild spat for their grow-out operations. Therefore, the need to improve the sustainability of seed sources as well as the diversification of species to be cultured has driven producers and researchers into considering hatcheries as the most logical solution.

As the news of the workshop began to spread, it became evident that the interest on studying the feasibility of hatcheries was not just local but of regional nature. I decided then that the list of speakers should include people with a broad understanding and experience on the topic. The invitation was extended to researchers, managers, government and industry representatives and academics to present current available knowledge and technology.

The main objective of the workshop was to present the three main management models for hatcheries: community based, government funded and business model and discuss which one would be best for Eastern Canada.

This publication includes a copy of the agenda, abstracts and a transcription of the discussion comments and closing remarks that could be used as reference materials. I do not pretend to give our personal opinions in this document but rather a source of information that could be applied by each reader for their own benefit and situation.



## AGENDA

8:30 - 9:00 *Good Morning Nutrition Break. Regency Ballroom*

### Shellfish Hatcheries Workshop - Admiral Ballroom

#### *Shellfish*

*Moderator: Andrew Bagnall*

9:00 - 9:10 Welcome and workshop overview

9:10 - 9:30 **Overview of the production cycle for bivalve culture**

Marc Ouellette, Shellfish research biologist, DFO, Moncton

9:30 - 9:50 **Seed supply and recent activities on shellfish hatchery development in BC**

Brian Kingzett, Field Manager, Centre for Shellfish Research, VIU

9:50 - 10:10 **Experiences in operating a shellfish hatchery for soft-shell clam public stock enhancement and applied research in Maine, USA**

Dr. Brian Beal, Director of Research, The Downeast Institute for Applied Marine Research and Education

10:10 - 10:30 **Production model of a community based hatchery**

Richard Kamey, Director, Martha's Vineyard Shellfish Group Inc.

10:30 - 11:00 *Nutrition Break - Regency Ballroom.*

11:00 - 12:00 **Discussion Session**

12:00 - 1:00 *Buffet Lunch - Admiral Room.*

*Moderator: Fernando Salazar*

1:00 - 1:20 **Past, present and future work at the New Brunswick Shellfish Hatchery**

Chantal Gionet, Biologist, Coastal Zones Research Institute

1:20 - 1:40 **Pre-commercial challenges during the start up and development phase of private funded hatcheries involved in new species development.**

Brian Blanchard, General Manager, Scotian Halibut Inc



- 1:40 - 2:00 **The role of an oyster hatchery in the Bras d'Or Lake: A First Nation's perspective**  
Allison McIsaac, Biologist, Unama'ki Institute of Natural Resources
- 2:00 - 3:00 **Discussion Session**
- 3:00-3:30 *Nutrition Break - Regency Ballroom*
- 3:30 - 4:00 **Conclusions and Wrap up**



## ABSTRACTS

### Overview of the production cycle for shellfish aquaculture in Eastern Canada

**Marc Ouellette**

*Shellfish research biologist, Fisheries and Oceans Canada, Gulf Fisheries Centre, Oceans and Science Branch, Moncton, NB, Canada, E1C 9B6*

The shellfish aquaculture industry has grown significantly and has become an important part of the economy in eastern Canada. The bulk of this industry is presently with the culture of two indigenous species: the blue mussel (*Mytilus edulis*) and the American oyster (*Crassostrea virginica*). Research and development of alternate species, for diversification of aquaculture activities, also increased during the last decades. Clam species such as the soft shell clam (*Mya arenaria*), the quahaug (*Mercenaria mercenaria*) and the bar clam (*Spisula solidissima*) have been particularly targeted because of their high market value. Interest with non-native species, such as the European oyster (*Ostrea edulis*) and the bay scallop (*Argopecten irradians*) is also still present. However, culture of these alternate species has not attained a level of sustainability due to various limiting factors in their production cycle. Issues such as unreliable wild spat collection, unstable or uneconomical hatchery production, slow or lack of uniform growth during the grow-out phase, erratic mortalities during overwintering (often attributed to harsh environmental conditions) and diseases outbreak (often attributed to habitat stress from anthropomorphic activities) still needs to be resolved. Furthermore, ongoing refinement and adaptation in the production cycle of the well established blue mussel and oyster culture is needed to keep them competitive on the global market and to respond to new challenges such as environmental concerns, water quality and aquatic invasive species.

The topic of this presentation will focus on various concepts and strategies in the production cycle for bivalve culture in temperate zones. The soft shell clam will be used as a case study. This discussion will hopefully assist in the research and development prioritization for shellfish aquaculture in Eastern Canada.



## **Seed supply and recent activities on shellfish hatchery development in BC**

***Brian Kingzett, M.Sc.***

*Deep Bay Field Station Manager, Centre for Shellfish Research, Vancouver Island University (formerly Malaspina University-College). 900 Fifth Street, Nanaimo, B.C. Canada V9R 5S5*

**Description:** Shortages of shellfish seed available from hatcheries in the US during 2005 thru 2007 highlighted the established fact that the development of the BC shellfish aquaculture industry is overly dependant on foreign sources of seed. In addition to straightforward issues of supply, dependence on foreign seed brings up issues of trade security risk in terms of permitting and regulatory issues and competition. Ability to pursue the development of indigenous species, ensuring higher seed quality and promoting hatchery and development specific to BC is restricted.

The Centre for Shellfish Research (CSR) at Vancouver Island University with support from the BC Ministry of Agriculture and Lands led a feasibility study in 2008 to examine the potential for developing a shellfish hatchery through some shared organizational vehicle that would make such a facility available to foster successful growth of the BC shellfish industry. This discussion will provide an overview of the situation, review the recent study and discussion that has followed.



## **Experiences in operating a shellfish hatchery for soft-shell clam public stock enhancement and applied research in Maine, USA**

**Brian F. Beal, Ph.D.**

*Professor of Marine Ecology, University of Maine at Machias, 9 O'Brien Avenue Machias, Maine 04654  
Director of Research, Downeast Institute for Applied Marine Research & Education, P.O. Box 83 Beals, Maine 04611*

In 1987, a public shellfish hatchery effort was initiated in eastern Maine for the primary purpose of enhancing commercial stocks of soft-shell clams (*Mya arenaria* L.) with cultured seed. At the time, clam landings were on a steep decline, and prices per bushel were at record high levels. Because downeast Maine is considered the center of the shellfishing industry as well as the soft-shell clam capital of Maine, the plan to create the "Beals Island Regional Shellfish Hatchery" was accepted enthusiastically by the industry and the local coastal communities.

After the first season of producing approximately 9 million clam seedlings, it became clear that two efforts must occur simultaneously for the stock enhancement program to succeed. First, additional resources for rearing microalgae must occur so that cultured juveniles could ultimately attain larger planting sizes (10-15 mm SL vs. 3-4 mm SL). Second, an applied research field component was necessary to increase the efficiency of planting success. After a decade of annual clam production and field work, we had determined that clams should be seeded in the spring rather than the fall (at the end of the hatchery and nursery production cycle), that clams should be planted in the lower-middle tidal zone for optimal growth and survival, that protecting clams with flexible, protective netting (6.4 mm aperture) would enhance survival by over 100% in most cases, and that seeding densities of 50-100 m<sup>-2</sup> would result in good growth. However, we found that as important as the seeding efforts were in enhancing local stocks of soft-shell clams, that our public education activities (working hand-in-hand with clammers and local stewardship committees, creating new learning opportunities for teachers and school children, collaborating with State of Maine marine resource managers, and serving as a conduit for information about clam biology, ecology, and management) were, perhaps, more important.

Through time, we found that a shellfish hatchery located in a working waterfront provided enormous opportunities for the community to learn about its resource, for a wide variety of scientific investigations focused on manipulative field experiments, and for opportunities to produce other shellfish besides soft-shell clams. In addition, it became clear



that by increasing the amount of space to hold live animals (more tanks and floor space), that additional opportunities for business incubation, research, outreach, and public education could exist. In 1999, the 15-member volunteer board of directors of the Regional Shellfish Hatchery began to explore possibilities to increase the scope of its operation, and in 2000 changed the name of the non-profit organization to “The Downeast Institute for Applied Marine Research & Education.” The board’s vision was to create the easternmost marine research laboratory, education center, and public shellfish hatchery in the United States. Its mission is to improve the quality of life for the people of downeast and coastal Maine through applied marine research, technology transfer, and public marine resource education.

In 2003, the board discovered an ideal coastal property in the town of Beals, only 3.5 miles from its previous location, to fulfill its vision and mission. In 2006, with assistance from Maine’s Congressional delegation in Washington, D.C., and with help from Maine’s Governor Baldacci and members of its state legislature, the Downeast Institute board purchased the 8-acre property with its 8,400 square-foot, two-story building, two commercial tidal impoundments, and 100-foot wharf. The facility has been transformed into a research and production shellfish hatchery that currently produces soft-shell clams, hard clams (*Mercenaria mercenaria* L.), European oysters (*Ostrea edulis* L.), American lobsters (*Homarus americanus* Milne Edwards), and green sea urchins (*Strongylocentrotus droebachiensis* [O. F. Müller]). In addition, plans are being made to produce sea scallops (*Placopecten magellanicus* [Gmelin]) in 2009. Production of these commercially important species centers around public stock enhancement (soft-shell clams, lobsters, urchins), and private farming (soft-shell clams, hard clams, European oysters) with the goal of incubating new businesses.

The Downeast Institute’s board continues to work toward its vision, and was a recent recipient of a \$1 million competitive grant award from the State of Maine to grow its infrastructure and purchase equipment to enhance its maricultural, ecological, and outreach activities. The present facilities serve as a marine field station for faculty, students, and staff from the University of Maine at Machias, a place for fishermen and others to meet and discuss issues related to the fishing industry, and as a center for school children and the general public to learn about the biology and ecology of local marine resources.



## **Seed shellfish production on Martha's Vineyard**

***Richard C. Karney***

*Director, Martha's Vineyard Shellfish Group, Inc., Box 1552, Oak Bluffs, MA 02557*

For over 30 years, the Martha's Vineyard Shellfish Group, Inc. (MVSG), a non-profit consortium of the Shellfish Departments of six Island towns has reliably produced disease-free shellfish seed from local broodstocks; principally, for municipal stock enhancement programs. Shellfish seed production averages about 15-20 million annually and includes quahogs (*Mercenaria mercenaria*), bay scallops (*Argopecten irradians*), oysters (*Crassostrea virginica*). In past years, the hatchery has produced soft-shell clams (*Mya arenaria*); and with grant funding provided single oyster seed for private growers and one year produced a half million seed sea scallops (*Placopecten magellanicus*).

Shellfish culture takes place at the MVSG Solar-assisted Shellfish Hatchery on Lagoon Pond in Tisbury and at the MVSG Shellfish Nursery on Chappaquiddick Island in Edgartown. Our hatchery, the first US public solar-assisted shellfish hatchery, was constructed during the energy crisis in 1980. The three-level, 1000 square foot hatchery is built into a south facing bluff and incorporates both passive and active solar components. Phytoplankton and larvae are cultured in a well-insulated greenhouse on the upper floor. The large volumes of water provide a sink for solar heat storage. Four active solar heat collectors on the middle level are tied to an electric hot water storage tank and heat exchanger, which together provide heat to warm sufficient amounts of seawater for cultivating shellfish during the colder months. A continuous seawater supply to the hatchery is provided by a pair of 2.5 hp swimming pool pumps located on a 65-foot pier extending into Lagoon Pond. The shellfish nursery on Chappaquiddick was constructed from a converted summerhouse in 1995. The 1,000 square foot facility is outfitted with 24 raceways and 48 upweller silos. The seawater supply is drawn with submersible pumps suspended from a piling situated in Edgartown Outer Harbor.

Over the years, a dependable and efficient methodology for seed production has been developed and will be explained.



## **Past, present and future work at the New Brunswick shellfish hatchery**

***Chantal Gionet***

*Biologist, Coastal Zones Research Institute, Inc. 100 Aquarium Street Shippagan, NB E8S 1H9*

The New Brunswick shellfish hatchery has started its activities in 1989. Its mandate of the hatchery was to contribute at the development and diversification of aquaculture in New Brunswick and to improve hatchery and grow-out techniques for the American oyster (*Crassostrea virginica*), which has been harvested in these waters since over a century. In 1996, the objectives were re-oriented towards improving the economic viability of culturing other shellfish species such as bar clams (*Spisula solidissima*), a selected variety of quahogs (*Mercenaria mercenaria* var. *notata*), soft-shell clams (*Mya arenaria*), Stimpson's surf clams (*Mactromeris polynyma*) and the Atlantic jack-knife (*Ensis directus*). The hatchery has ever since played a major role in producing seed for various research projects throughout New Brunswick and Atlantic Canada, and improving information and technology transfer to the industry. Since 2004, the focus was placed on the development of a selective breeding program and the evaluation of performance of the triploid oyster in the American oyster (*Crassostrea virginica*). Probiotics and alternative foods developed specifically for shellfish hatchery are also being studied. Different research projects with private growers are also part of the shellfish team activities. This presentation will explain the work that has and is being done at the shellfish hatchery, and the importance of shellfish hatcheries to the long term sustainability of the shellfish aquaculture.



## **The role of an oyster hatchery in the Bras d'Or Lake: A First Nation's perspective**

***Allison McIsaac***

*Biologist, Unama'ki Institute of Natural Resources, Eskasoni, Nova Scotia*

The Unama'ki Institute of Natural Resources (UINR) and the Eskasoni Fish & Wildlife Commission (EFWC) have been looking into ways to deal with the oyster disease, MSX, since the confirmation of its presence in the Bras d'Or Lakes in 2002. Both organizations approach the problem in a multifaceted way, incorporating the Mi'lmaq world view into their research. When addressing the problem, we must look at not only the oyster, but all the things that affect the oyster such as habitat, ecological influences and anthropogenic influences. All impact the health of the oyster, but, for the most part, it is the anthropogenic influences that we, as humans, can best address, such as near shore development and construction practices.

The hatchery facility at EFWC has received funding to look at disease tolerance in the American oyster from ACRDP. The First Nations communities have put a tremendous effort into researching the possibility of developing an oyster that can resist MSX until it reaches market and plan to continue this work along with ensuring that the oyster remains in the ecosystem to fulfill its ecological role.



## DISCUSSION

The first round of discussion brought up the main concerns of hatchery development as well as analysis on the type of management that hatcheries in Canada should adopt. The following paragraphs summarize some of the most relevant comments given.

Statement: “Hatcheries don’t make money”

Comments:

- It depends. Hatcheries can make money in the long term as long as they are well supported during its conception and first phases of development.
- It is worth to invest in hatcheries and develop the technology that eventually will lead to making money in the long term.
- Human resources is one of the most important factors in making money. Building on a strong R&D is crucial to determine why some biological failures happen.
- Experienced staff is a must for the successful development of hatcheries. It is hard to keep professional people as full staff and the overturn of positions is time consuming and costly.
- All hatcheries deal with same issues, and the difference between a research hatchery and a mass production one is the structure of the hatchery. That is essential.
- Securing R&D grants can be an important component in supporting a commercial hatchery.

Question: “Are there good examples of public hatcheries?”

Comments:

- In Australia, hatcheries are run by government as a support to the industry, but there seems to be a lack of those kinds of hatcheries elsewhere.
- In Canada, there was a case when the federal government was selling oyster seed at a subsidized cost and in those days oyster production was rampant. The system was functioning as a wild collection and hatchery facility.
- In Norway, hatcheries are run with close collaboration of universities to maintain staff.
- It seems that examples of good public hatcheries exist in other places or other times, but nothing recent and local (Canada), so what is it about current Canada that doesn’t follow up?

Question: “Where do companies compete, at hatchery level or end product?”

Comments:

- There are companies that favor end product competition and others favor hatchery. No consensus has been made on the most appropriate hatchery model.



Statement: “So speaking of hatchery models...”

Comments:

- Has anyone tried to create a co-op model?
  - It is a work in progress in BC. Different models have been suggested to a group of companies to see if they want to pick it up. The government is willing to put some money as long as there is a model chosen.
- Economic crisis make people think and re-evaluate past decisions or try new things. We are now living in crisis. This is the right time to propose models for hatchery development.
- It seems that in any proposal, there is a general fear every time the word hatchery is in it. So answering questions as basic as: Do we need a hatchery? Should be clearly answered to inform the funding agencies that they shouldn't fear hatchery development.
- In IMTA operations, new species of invertebrates are being considered to be used as biofilters for suspended and deposited organic matter and the source of seed will have to come from a hatchery. Defining a model to work on a multispecies hatchery may work.
- In a large scale hatchery, the balance between a R&D and commercial model may be the best way to go, though sales of the product is the tricky part. Nevertheless, for large operations a commercial business model with associated R&D seems to be the best option.
- Has anybody thought of a hatchery model run by associations? It is a model that works for salmon in New Brunswick.
  - It hasn't been tried and it could be a possibility as long as there is no conflict of interests.
  - In Australia, they do not let industry share the management of hatcheries with academia because the R&D suffers.
- Another model with promising future is the corporate model in which companies with mutual interests get together and build a hatchery that will be managed as a separate entity with a manager that has no ties to any of the mother companies. This model could be applied to associations too.

Statement: “In general, what can we say in terms of planning, operation and funding?”

Comments:

- It is clear that hatcheries can be managed by a combination of cooperation of the 3 main models: Private, Public and Academic.
- The word hatchery seems to attract a negative perception. So, change the name. Also, focus the objectives of hatcheries into: “regenerating the quality and nutritional value of shellfish through the production of high quality seed...”
- Make a loud voice in Ottawa about the importance of cooperation when setting up a hatchery.



- The need for a strong champion that plans and coordinates every stage of the development of a hatchery is fundamental to approach the right investors/funding.
- There is a need to motivate and engage investment in the shellfish industry itself. There seems to be a lack of interest in getting involved due to lack of support.
- There are growers interested in getting shellfish seeds for several species, and having just one to take care of all the needs of the growers is not a feasible option. More are needed. A quick example of current needs brought up by growers present at the workshop:
  - *Ostrea edulis* seed 100,000 per cycle
  - Soft shells 5-10 million
  - *Placopecten* 0.5 million
- Speaking of political engagement, hatcheries development should be seen as an opportunity to create a business with direct benefits to local communities before approaching government. Operations should be geared towards benefitting public and communities.



## IN SUMMARY

The second round of discussion was a summarizing exercise of the most important things to consider when developing a hatchery (discussed during the first round). The transcript of the general consensus follows:

- Diversification of models of operations.
- Focus on goals before laying the model and plan. Mesh with commercial operations and research based hatcheries.
- Co-op model seems to be the best way if they are:
  - Independently managed
  - Corporate base
- Multispecies.
- Short term life of hatcheries has to be funded and long term can lead to economic sustainability.
- Involvement of academia is necessary for R&D and for providing staff to avoid excessive turnovers.
- Hatchery structure has to be set according to the community where the hatchery will be held
- Benefit to communities is something that has to be reflected.
- There is nothing wrong with transfer of technology. The Australian models could teach us a lot.
- Utilize and modernize infrastructure and adapt it for hatcheries.
- Different approach between hatcheries models.
- Involvement of associations in the development of the model or even management of the hatchery is a possibility, but the role of the associations should be very clear to avoid conflict of interests or compromise its existence.
- Consider the market.
- Business models of hatchery and grow-out are not always fully compatible in production timing so a long term viability of the hatchery is crucial to consider for the success of the operation.
- Do not overlook our success in currently working hatcheries.
- Hatcheries are means to an end. Money is not on the seed and focus should be put on the end product.
- The need for a company to be linked to a hatchery is a key factor for continuing the cycle all the way to the money generating part.



- Analyze past failures and learn from them as case studies.
- Hatcheries should be anchored in 2 ways:
  - Business, profitable models
  - Community based strongly linked to communities for political platforms
- Multiple front approach to hatcheries, again, depending on the goals.
- Community based hatcheries may be the role of government enhancement as well as research based hatcheries.
- And the private based, production (commercial) should be a completely separate entity from other models.
- Community based challenge is the funds and for how long.
- Do not dichotomize heavily both models of production (community based and commercial).
- For immediate future the economic model may be the best focus for prosperity with government funds especially if they are tied to community involvement.
- At least 3 types for immediate development (one commercial, one research based and one community).
- Secure survival of currently operating hatcheries.
- Do some homework in regional future of existing underutilized hatcheries and jump the hurdles of the development phase.
- One page business plan for resource agencies to take home. SOLICITING CHAMPIONS!!
- Start building partnerships and get things moving.



## **CONCLUSIONS**

The objective of the workshop was to discuss the feasibility of shellfish hatcheries in Eastern Canada by studying the cases applicable to each management model generally used in hatcheries.

It is safe to say that the workshop showed that shellfish hatcheries are feasible as long as the venture is well planned and the models are defined prior to the development of the hatchery. Also, the goals of the hatchery (commercial production, restoration of natural populations, research, etc) have to be established before deciding on the most appropriate model(s) to use.

The market of the product, size of the operation and cooperation with government, academia, industry and communities should be some of the crucial aspects to consider during the planning process.

Large scale hatcheries are more challenging to manage, and pose a very high risk of failure if they are based on only one management model. It was identified that co-op models are better suited for success, especially if consolidated as a corporation.

In small scale operations a business model can work successfully given that a stable market for the product is in place, or that the hatchery is associated to a grow-out operation that ensures its long term survival.

All scales of hatcheries are long term ventures that need to be supported on their initial phases of development. A strong R&D and consistent professional staff are keys to the hatchery's success.

## **ACKNOWLEDGEMENTS**

I want to thank all the presenters/speakers who generously shared their time and expertise that formed the backbone of the workshop.

Likewise, I appreciate the excellent turnout and the level of engagement showed by all attendees. The discussion sessions were extremely informative and positive.

Special thanks to Denise Methé from the Aquaculture Collaborative Research and Development Program (ACRDP) for the funding that made this workshop possible. I look forward to future collaborations.