

# Shellfish Aquaculture Brainstorming Workshop

## APPENDIX III

### ACTION PLAN

#### (List of Potential Projects)

Because of the over-arching consistency of certain key issues, and the high priority attached to them, it became apparent these would form the strategic issues for an Industry Development Strategy or “Action Plan”. Further analysis of the results indicated that a series of targeted research themes would provide the necessary “building blocks” that are critical for long-term industry growth and development. Specific research projects are associated with each building block, providing the critical information needed to systematically solve industry issues, providing key outputs for industry growth and sustainability, and ensuring a solid foundation for long-term success.

If implemented, the following list of projects will serve to assist the BC Shellfish Aquaculture Industry achieve the joint industry/government/academic vision of “\$70 million in 5”. While not finite, the attached list of potential projects is comprehensive and significant enough to address a number of key issues and industry needs. Not all project descriptions are complete and it should be understood that these projects require further development before commencement.



CSR



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**Appendices**

- 1. List of Participants**
- 2. Analysis of Needs Charts**

## List of Acronyms

AAFC	Agriculture and Agri-Food Canada
AHRDA	Aboriginal Human Resources Development Agreements
BCMAFF	BC Ministry of Agriculture Food and Fisheries
BCARDC	BC Aquaculture Research and Development Committee
BCSGA	BC Shellfish Growers Association
C, S and E	Ministry of Competition Science and Enterprise
CSR	Malaspina University-College Centre for Shellfish Research
DFAIT	Department of Foreign Affairs and International Trade
DFO	Fisheries and Ocean Canada
EC	Environment Canada
HRDC	Human Resources Development Canada
INAC	Indian and Northern Affairs Canada
LWBC	Lands and Water BC Inc.
MAL-U	Malaspina University College
MSRM	Ministry of Sustainable Resource Management
NIC	North Island College
OCAD	Office of the Commissioner for Aquaculture Development (DFO)
OSA	Office of Sustainable Aquaculture (DFO)
TNO	Treaty Negotiation Office
UBC	University of British Columbia
VIEDA	Vancouver Island Economic Developers Association
WED	Western Economic Diversification Agency
WLAP	Water, Lands and Air Protection

## **Theme A – Policy & Regulatory Development**

### **PROJECT 1: DEVELOPMENT OF POLICIES TO ENABLE SHELLFISH AQUACULTURE DIVERSIFICATION IN BC**

#### **Background**

There was clear consensus in the workshops that government's regulatory role vastly out-weighs and in fact, even obstructs potential industry development. The need for strong and supportive government policies and a “will to make it happen” were raised repeatedly in all 6 workshop groups. No matter what issue was being discussed, the need for enabling policy development was fundamental and essential for resolution of the issue.

BC entrepreneurs have been pursuing new species diversification opportunities with vigour over the past decade. Species of interest include geoducks, green urchins, abalone and sea cucumbers. Businesses and industry development based on these species have been slow to develop due to the lack of policies that would enable access to broodstock and seed stock to support industry development.

The “Brainstorming Workshop” identified a 5-year vision of \$70 million in 5 years, which included the wholesale value of new sales based on geoducks, varnish clams and green urchins, in addition to the “traditional” species. The wholesale value in the vision was limited by the recognition that significant policy changes are required to facilitate shellfish aquaculture diversification opportunities in BC. The Economic Opportunities workshop group highlighted the need to address new species opportunities – especially policy constraints. The BCARDC priority setting exercise in 2001, also identified policy as the biggest constraint to aquaculture development of new species opportunities in BC.

#### **Project Objective**

*To evaluate the opportunity cost of the current policy regime affecting shellfish aquaculture diversification in BC. This will involve recommendations for how government can support new species diversification in a serious way.*

#### **Project Components**

This project will involve a review of a number of policies from both the Provincial and Federal government:

- The current DFO Aquaculture Policy Framework will be reviewed to determine if Pacific Region policy is in line with this new framework. For example, the policy framework document states: ‘this policy framework must set the stage for creative governance approaches such as site access, R&D and programs enabling industry development’. In what way is this being supported and enacted by DFO Pacific Region?



- Examination of the current shellfish aquaculture policies of the BC Ministry of Agriculture, Food and Fisheries as well as the Ministry of Land, Water and Air Protection etc. will also be reviewed and assessed as they relate to species diversification.

**Project Lead:**

CSR

**Possible Project Support:**

DFO

OCAD

BCMAFF

OSA

Industry

## **Theme A – Policy & Regulatory Development**

### **PROJECT 2: AN INTERNATIONAL COMPARATIVE POLICY AND REGULATORY FRAMEWORK INVESTIGATION**

#### **Background**

Many, if not all, of the shellfish species that are of interest to aquaculturists to provide diversification opportunities are fished through licensing of “Individual Transferable Quotas” or (ITQ’s). License holders are concerned that aquaculture development of these species may negatively affect their livelihoods, primarily through marketplace impacts. Arguably, these concerns have translated into a lack of opportunity for aquaculture entrepreneurs.

#### **Project Objective**

*To conduct a comparative investigation of the shift from fisheries to aquaculture in other countries where fisheries are managed under an ITQ system, including lessons learned and application to BC.*

#### **Project Lead:**

CSR

#### **Possible Project Support:**

DFO

OCAD

BCMAFF

OSA

Industry

## **Theme A – Policy & Regulatory Development**

### **PROJECT 3: NEW MECHANISMS FOR POLICY DEVELOPMENT IN BC**

#### **Background**

Development of new DFO policy to support aquaculture opportunities for new shellfish species has been in process since approximately 1995 – with no conclusion. This lack of policy has constrained aquaculture diversification in BC.

#### **Project Objective**

*To explore new mechanisms for improved capacity, breadth and depth of public policy development in BC in order to support sustainable shellfish aquaculture development.*

#### **Project Lead:**

CSR

#### **Possible Project Support:**

DFO

OCAD

BCMAFF

OSA

Industry

## **Theme A – Policy & Regulatory Development**

### **PROJECT 4: REVIEW OF CURRENT APPLICATION REVIEW PROCESS**

#### **Background**

Access to new shellfish aquaculture sites on a timely basis, and within an acceptable cost structure is vital to achieve the industry vision of “\$70 million in 5”. The current aquaculture tenure site application process is lengthy and the information requirements are poorly defined. In addition to tenure applications for existing species, there is no defined federal or provincial process for review of new species aquaculture proposals and policy is developed on an ad hoc basis.

Shellfish aquaculture proponents have identified a lack of information and a never ending series of meetings and information requests to address issue after issue. The result is a frustrating and time-consuming process for industry and government alike. From industry’s viewpoint it is difficult to gauge whether progress is being made, especially as the process and timelines are undefined. Clearly, unless the information needs of all parties involved are met at the outset, the process will become stalled. Aquaculture proponents (both new & existing species) need an information package that identifies all of the information required, the evaluation criteria, the process and timetable, and the individuals involved – a fully transparent process. This project will review the current process and assess its ability to meet the above objectives.

Ideally, this project will coincide with the start- up of the new shellfish-training farm (see R&D/Training). If so, then tenure application for the farm can be followed through to completion and the exercise be used as a pilot study. All stages of the application and referral process will be documented, including timelines, information requested, how the information requested is used (or not), costs, flow of information, referral agencies and process duplication etc.

#### **Project Objective**

*To document the current application process for new tenures (existing & new aquaculture species) and make recommendations for improvements to the process and the information/application package.*

#### **Project Lead**

CSR  
LWB C

#### **Possible Project Support**

DFO / OCAD / OSA  
BCMAFF  
Regional District  
Industry

## **Theme B – Leadership**

### **PROJECT 1: THE ROLE OF AN INDUSTRY ASSOCIATION IN INDUSTRY DEVELOPMENT & INNOVATION**

#### **Background**

To build a world-class shellfish aquaculture industry, there was clear consensus within the workshop participants that strong leadership, both within industry and government, was a key component.

The importance of an organization that will work actively to create collaborative connections and strategic alliances, as well as create an opportunity for dialogue with other key stakeholder representatives (including other growers, processors, NGO's, educational institutions, First Nations and governments) cannot be overstated.

The ability of an industry organization to actively participate in industry development is not unique to the seafood sector. Examples of effective and innovative organizations can be found worldwide – some of which may prove to be excellent models as the current shellfish aquaculture industry organization in BC (BCSGA) evolves and matures.

#### **Project Objective**

*To initiate a comparative examination of national and international agri/aqua food industry organizations to determine what kind of role industry organizations play in all aspects of industry development (i.e. knowledge creation and dissemination, policy development, marketing, human resource training etc.) as well as what mechanisms are in place to assist them in contributing to industry innovation and success. The New Zealand Mussel Council, the Norwegian Fish Farmers Association, as well as other agri-food sector organizations such as the BC Wine Institute would be included in this review.*

*From this review, recommendations will be provided on creative governance approaches that are not currently being considered within the BC shellfish aquaculture industry. Recommendations for appropriate funding mechanisms should form a key section within this project.*

#### **Project Lead:**

CSR

#### **Possible Project Support**

BCMAFF

Agriculture and Agri-Food Canada

OCAD

DFO

## **Theme B – Leadership**

### **PROJECT 2: A NEW MODEL FOR WEALTH CREATION IN THE KNOWLEDGE BASED ECONOMY**

#### **Background**

“Significant and profound changes are occurring in the way that industry, governments and universities interact and utilize science and technology for wealth creation. These changes are driven by three paradigm shifts related to innovation, competitiveness and university/government/industry relationships.... in which the cumulative result of these paradigm shifts is that there is a complex interaction between government, industry and universities driven by the need for wealth creation, the need to maintain competitiveness on a global scale and the need to ensure optimum linkages and outcomes between research and commercialization.”  
(Tegart, G. 1997. [www.aste.org.au/publications](http://www.aste.org.au/publications))

The Federal Innovation Strategy stresses the need for innovation and emphasizes the role of universities. It notes an important paradox in that, in a globalized, knowledge-based economy, the sources of competitive advantage tend to be localized in communities where the elements of innovation come together – through the formation of “industrial clusters”. The Federal Innovation Strategy paper also indicates that “Canada can do a great deal more to stimulate the development of additional world-class clusters. Governments need to recognize the earliest signs of emerging clusters and provide community-based support. Each cluster and host community has unique strengths and challenges. The challenge for governments is to provide the right kind of support at the right time to create the conditions for self-sustaining growth.” Needs the reference/date

#### **Project Objective**

*To identify, examine and compare the development of aquaculture clusters in Canada. This will be followed by recommendations for opportunities and approaches for targeted support to create new aquaculture clusters in BC or grow existing ones. Through aquaculture innovation, wealth and job creation potential will be realized.*

#### **Project Lead**

CSR

#### **Possible Project Support**

Industry Canada

WD

ACOA

C,S and E

Ministry of Advanced Education

HRDC

## **Theme C- R&D/Training**

### **PROJECT 1 PHASE 1: DEVELOPMENT OF SHELLFISH AQUACULTURE TRAINING FARM**

#### **Background**

Emerging industries, such as shellfish aquaculture, require focused research and development support if they are to continually improve international competitiveness. A world-class shellfish aquaculture industry also requires a highly skilled and educated workforce operating in an environmentally and socially sustainable manner.

An operational shellfish farm field-site would serve to address a variety of key industry needs. In addition to being a demonstration platform for a wide variety of training and research initiatives, a training farm would also provide a much needed venue to showcase the industry to the public. With a “model” site for the community and environmental groups to tour, public confidence in BC’s shellfish aquaculture development should result.

In addition to utilizing the farm site to conduct R&D (addressing issues such as environmental sustainability, industry competitiveness and productivity), it will be important that the training farm serves as a vehicle to test R&D findings, pilot new approaches to production techniques and then finally, transfer information and techniques to new and existing industry members. Industry will be more likely to view R&D results that have been piloted and tested at the training farm as reliable and based in practicality.

Education and training play a large role in the continued economic growth of the shellfish aquaculture industry. Since adult learners retain information more effectively in a hands-on learning environment, a field-training site is extremely important for the implementation of a shellfish aquaculture training program. Training programs conducted on the farm site can be tailored for those individuals interested in working in the shellfish farming industry and/or those interested in becoming an owner/operator of a shellfish farming operation. Training of new farmers is a critical aspect of the business viability of new operations.

First Nations interest in aquaculture is growing dramatically with over 35 Bands currently preparing business plans (TNO, personal comm.). A recent First Nations shellfish aquaculture report identified training and capacity building as a key requirement for success (Doyle, 2002)<sup>1</sup>.

#### **Project Objective**

*To resolve the developmental issues around accessing and managing a shellfish aquaculture training farm.*

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<sup>1</sup> Doyle. C. J. March 2002. Cultivating Opportunity: A management strategy to expand First Nations’ participation in BC’s shellfish aquaculture industry. Prepared for Indian and Northern Affairs Canada British Columbia Region.

## **Project Components**

This project will involve discussions and negotiations with Land and Water BC to access the tenure. The project will also require development of a comprehensive Training Site Business Plan.

The business plan would include such items as:

- Scope of Business (include training aspects, R&D aspects, possible community involvement etc.)
- Marketing of Training Site
- Operating Procedures
- Personnel Required
- Financial Plan

## **PROJECT 1 PHASE 2: IMPLEMENTATION OF SHELLFISH AQUACULTURE TRAINING FARM**

### **Project Objective**

*To complete the necessary steps to make the training farm operational. Some of those steps will include: acquisition of site, purchase of technology, construction of facilities, and development of training infrastructure.*

### **Project Lead:**

CSR/ Land and Water BC /Industry (including CAIA)

### **Possible Project Support:**

HRDC  
ARDA  
INAC  
TNO  
Ministry of Skills and Training  
C,S and E  
DFO  
BCMAFF  
WED  
AAFC – Rural Development Initiative

## **Theme C- R&D/Training**

### **PROJECT 2: DEVELOPMENT OF PROVINCIAL TRAINING PROGRAM FOR NEW ENTRANTS AND EXISTING INDUSTRY MEMBERS**

#### **Background**

The existence of a farm site creates an excellent opportunity to conduct training. However, rather than conduct training that is ad-hoc in nature, the development of an accredited provincial shellfish farm training program that is supported by both industry and academic institutions alike would be an important step in the development of a world class shellfish aquaculture industry.

#### **Project Objective**

*To develop an accredited multi-level, articulated provincial training program that reflects industry's current and future needs. Training programs are required for both new entrants and existing industry members.*

#### **Project Components**

- The following elements should be considered:
  - Off-site components
  - Self Learning Opportunities
  - Curriculum Development
- Existing programs and initiatives in BC and other jurisdictions would be reviewed and assessed to reduce the possibility of “re-inventing the wheel”.

#### **Project Lead:**

CSR/ LWBC /Industry (including the Canadian Aquaculture Industry Alliance)

#### **Possible Project Support:**

UBC, Mal-U, NIC

HRDC, ARDA

INAC, TNO

Ministry of Skills and Training

C,S and E

DFO

BCMAFF

WED

AAFC – Rural Development Initiative

## **Theme D- Communications**

### **PROJECT 1 PHASE 1: THE DEVELOPMENT OF AN INDUSTRY COMMUNICATIONS PLAN**

#### **Background**

The visioning workshop confirmed that to be politically, socially and economically successful, the shellfish aquaculture industry would need broad based support from First Nations, local governments, community organizations, commerce and trade networks, educational and cultural institutions and community residents. To achieve this objective, a strong and effective communications campaign is necessary.

Shellfish culture practices are coming under greater environmental and public scrutiny as the public becomes more sensitive to food production methods. Recent expansions of shellfish farming areas in BC have resulted in negative campaigns against shellfish farming, placing industry members on the defensive and diminishing constructive dialogue between growers and community members. For long-term growth and expansion of this industry, it is critically important for the industry to build alliances and garner a stronger level of local community support.

Key communication messages might include the following:

- the BC shellfish farming industry supports coastal communities by providing employment, contributing to local economies and being actively involved in community events
- the BC shellfish farming industry has developed policies and practices to ensure that all activities are managed in an environmentally responsible and sustainable manner

#### **Project Objective**

*To develop an effective industry communications strategy and plan that will serve to convey correct and timely industry information to a variety of key target audiences. This information flow will assist in building alliances in communities through increased public trust and confidence. The potential of the shellfish industry to make a significant contribution to rural prosperity must be communicated. By positioning the shellfish aquaculture industry in BC as a vibrant and internationally competitive industry, outside investment will be attracted as well.*

#### **Project Components**

##### **Communications Plan**

First, a communications plan needs to be developed that will outline:

- What are the various issues and information that needs to be communicated?
- Who should be the target for the information?

- What organization/agency should “deliver” the message? In the workshop, it was strongly identified that a group or organization takes a leadership role in public education as well as communicating the benefits of shellfish aquaculture to coastal communities in BC.
- What communication tools should be used to most effectively reach the target markets? (i.e. communities, media, investors).

### **Communications Strategy**

Following the communications plan, a communications strategy will need to be developed to reach the key target markets (i.e. community groups, media, investors etc.). This is an important step as the information, as well as the information vehicle, used to garner community support may be quite different than the information to showcase the opportunities and potential for outside investment.

## **PROJECT 1 PHASE 2: IMPLEMENTATION OF THE COMMUNICATIONS PLAN**

### **Project Objective**

*To implement the communications plan, using a series of communication tools, which may include use of website, magazine and newspaper editorials, trade shows, tours, brochures, direct mail, newsletters and highway signage.*

### **Project Lead:**

BCSGA (“Building Community Confidence Program”); individual shellfish corporations

### **Possible Project Support:**

Other Industry Associations (e.g., BC Seafood Alliance)

VIEDA

Canadian Rural Partnership – Rural Development Initiative

WED

## **Theme E- Marketing**

### **PROJECT 1: MARKET INTELLIGENCE/TRADE INFORMATION FOR SHELLFISH AQUACULTURE**

#### **Background**

To date, production plans for the BC shellfish aquaculture industry have been made in isolation of domestic or global market information and trends. To improve the economic health of the shellfish aquaculture industry, industry members require increased market information (including marketing opportunities and marketing issues to be faced), production/demand forecasting as well as consumer information to enable growers and processors to develop sound and strategic business plans.

BC shellfish marketers have primarily been “order takers” with demand far exceeding the capability to supply. As production increases, this situation is changing. To avoid temporary gluts in existing distribution channels and associated pricing problems, shellfish farming companies require a market and trade information base, to assist them in making wise business decisions and enable them to reach beyond their traditional sales networks.

It is difficult for small and mid- size companies to keep up and respond to changing marketing conditions. To become tougher competitors and improve profitability, industry members need basic market/trade information on a regular basis.

#### **Project Objective**

*To undertake a global competitive analysis of the shellfish aquaculture industry. This marketing analysis would allow industry members to predict marketing trends (i.e. future supply and demand), increasing their ability to plan and make more informed business decisions.*

#### **Project Components**

Information would include the following areas:

- Customers (where are they, who are they, what do they want, what will they pay)
- Competition
- Trade Barriers (tariff and non-tariff)
- Production Trends (historical, actual, anticipated, potential)
- External Environment (social, political, cultural, regulatory)

#### **Project Lead:**

CSR

#### **Possible Project Support:**

Agriculture and Agri-Food Canada /DFO/OSA / WD /Industry Canada / DFAIT

## **Theme E- Marketing**

### **PROJECT 2 PHASE 1: RESEARCH & DEVELOPMENT OF A BC CONSUMER GENERIC MARKETING STRATEGY**

#### **Background**

Globally, consumption of shellfish is increasing. However, unlike other BC products, BC shellfish have not experienced increased demand locally. As the majority of shellfish products are exported, there has been very little focus and attention on the development of consumer loyalty domestically, as well as the expansion of local markets. Very little coordinated effort has been given to either education or marketing of BC shellfish products, particularly in BC.

Awareness of the industry and the variety of products farmed in BC is also poor and as a result, there is a lack of pride and support for shellfish aquaculture as an important component of BC's farming community.

Generic marketing campaigns work by marketing an industry's product without reference to any company's brand name. In other words, a generic advertising campaign would facilitate the positioning of a particular commodity (e.g., BC farmed shellfish) as compared to the advertising of a specific brand of shellfish.

Currently there is an initiative through the Canadian Aquaculture Industry Alliance (CAIA) to develop a national strategy for marketing of farmed fish and shellfish. The aim of the project is to establish a 5-year marketing campaign that focuses on food security, safety and health. There may be some benefit in linking this BC project with the national approach.

#### **Project Objective**

*To develop a generic marketing strategy that will lead to increased domestic consumption and sales. This strategy will involve targeted initiatives to increase consumer demand for BC shellfish products.*

#### **Project Components**

##### **Background Research**

The approach would involve conducting interviews with growers, distributors and buyers from both retail and foodservice sectors. In addition, direct input from consumers will be necessary to determine usage, attitudes, awareness levels and consumption triggers.

Information obtained from review of best practices in agriculture/food marketing (see Theme H: Business Development; Project 4) would also be important for this project.

## **Development of Strategy - options for consideration and recommendations**

Given survey results and information from a review of best practices in ag/food marketing, a strategy would be developed, including target market(s), appropriate messaging, costs and evaluation techniques.

## **PROJECT 2 PHASE 2: IMPLEMENTATION OF A BC CONSUMER GENERIC MARKETING STRATEGY**

### **Project Objective**

*After the strategy is complete, it will be necessary to implement it.. This will involve the development of appropriate education and promotional materials that will be used in the campaign, including an interactive web- based market access database.*

### **Project Components**

The development of promotional materials will link with the generic marketing strategy.

The database would include contact information about producers, including links to their websites. It would also list production location(s), business types, production volumes, varieties, sizes and product forms. The database could be expanded to include growing methods, packaging options and shipping capabilities. The information should be updated weekly. While this marketing tool requires broad participation in order to be considered a valuable resource, it could be very effective in expanding awareness of BC shellfish products.

### **Project Lead:**

BCSGA  
BC Seafood Alliance  
CAIA

### **Possible Project Support:**

Agriculture and Agri-Food Canada /DFO/OSA / WD /Industry Canada / DFAIT

## **Theme F- Environmental Sustainability**

Expansion of the BC shellfish industry will be most easily accomplished by demonstrating the environmental and social sustainability of shellfish culture operations. Implementation of a series of research projects based on sound scientific principles and providing peer-reviewed information will improve scientific understanding of both positive and the potential negative effects of shellfish culture technologies. This new information will ultimately lead to the development of sustainable culture practices, an improved regulatory review process and framework, and increased public confidence. This confidence will result in increased tenure expansion opportunities, jobs and exports.

A series of research investigations on the ecological interactions of shellfish culture activities are proposed as follows.

### **PROJECT 1: THE EFFECT OF ANTI-PREDATOR NETTING ON MANILA CLAM (*VENERUPIS PHILIPPINARUM*) RECRUITMENT, SURVIVAL, AND GROWTH IN BAYNES SOUND, BC.**

*This M.Sc. project is underway and supported by the Centre for Aquaculture and the Environment at UBC and the Centre for Shellfish Research at Malaspina U-C.*

### **PROJECT 2: AN ECOLOGICAL INVESTIGATION OF SUSPENDED (DEEPWATER) OYSTER CULTURE OPERATIONS.**

#### **Background**

The Centre for Shellfish Research (CSR) is proposing a comprehensive study to investigate the ecological interactions caused by suspended oyster culture operations (raft, long-line systems) which documents both sides of the ecological balance sheet- the positive and the negative. A multi-disciplinary team will be assembled to investigate interactions on all trophic levels and tie the results into an ecological model. This study will provide a vehicle for a variety of graduate and post-graduate investigations as well as an opportunity for undergraduate assistants.

#### **Project Objectives**

*To document any changes to the nearshore open water ecosystem that occur as a result of the establishment of a suspended oyster culture operation.*

### **PROJECT 3: DEVELOPMENT OF A CARRYING CAPACITY MODEL FOR BC SHELLFISH AQUACULTURE OPERATIONS.**

#### **Background**

This project will build on the work outlined in the recently published Gorge Harbour Study (Richardson and Newell 2002), which documented phytoplankton production in relation to biophysical parameters and phytoplankton depletion relative to a suspended oyster culture operation.

#### **Project Objectives**

*To develop a generic model carrying capacity model for use in site assessments and in site planning to optimize productivity.*

### **PROJECT 4: THE IMPACT OF SHELLFISH CULTURE ACTIVITIES ON NATURAL SHELLFISH PREDATORS**

#### **Background**

All farming, whether land based or aquatic, requires effective predator mitigation strategies to be successful.

#### **Project Objective**

*This study will examine the effectiveness of shellfish culture practices targeted at predator exclusion and the effects they may have on predator populations.*



**PROJECT 5: AN INVENTORY OF RELEVANT SCIENCE AND ONGOING PROJECTS  
ON THE POTENTIAL IMPACTS OF SHELLFISH AQUACULTURE  
ACTIVITIES**

**Background**

There is a need for a comprehensive inventory and depository for all information pertaining to the potential ecological interactions of shellfish culture in BC.

**Project Objectives**

*To document and create an inventory of all information pertaining to the potential ecological interactions of shellfish culture in BC.*

**Project 3, 4 & 5 Lead**

CSR

**Possible Project Support**

DFO

MSRM

WLAP

UBC

BCMAFF

OCAD

Industry

## **Theme G- Food Safety**

### **PROJECT 1: DEVELOPMENT OF AN ON-FARM FOOD SAFETY SYSTEM**

#### **Background**

Without formal quality control and verification procedures, there is potential for increased risk of shellfish safety problems. Implementation of an On-Farm Food Safety Program for shellfish aquaculture will make a positive contribution to the industry's credibility in the domestic and international markets, and ultimately will provide consumers with additional assurances about the safety and quality of BC's farmed shellfish products.

#### **Project Objective**

*To implement an On-Farm Food Safety System paralleling that being developed for agriculture products through the Canadian On-Farm Food Safety System (COFFS).*

#### **Project Components**

The implementation of an On Farm Food Safety System will involve a number of steps and components.

#### **Communication Strategy**

Since preliminary pilot studies have already been completed to test on farm HACCP systems, the results of this important work will need to be clearly communicated to industry members. It will be very important to increase the growers' understanding of the importance of food safety systems at the production level.

#### **Develop an On-Farm Food Safety Manual**

A comprehensive hands-on manual for farmers should be developed to use or at a minimum, have access to, as the reference guide for the development of the On Farm Food Safety Program for Canadian Farmed Shellfish. This will provide the necessary reference documents to help farmers make appropriate food safety decisions.

#### **Establish an accreditation mechanism with CFIA**

There will be a need to work closely with COFFS on a parallel track to other agriculture initiatives to ensure that On-Farm Food Safety Systems for shellfish aquaculture are recognized by CFIA. In order to build confidence in the involvement of industry in food safety and environmental management systems, programs must be linked with enforceable standards, verification processes and possible recognition by a regulatory or certifying body. In the Marketing workshop, it was suggested that "certification strategies" should be explored to enhance the positioning of BC farmed shellfish products in the marketplace.



## **Establishment of Shellfish Quality Advisors**

A possible model for advancing implementation of an On-Farm Food Safety System would be the establishment of a core group of regional or provincial shellfish quality advisors. These advisors would be responsible for assisting farms in developing their own unique food safety/HACCP plans and would be certified to audit On-Farm Food Safety Systems.

### **Project Lead:**

CSR

BC Ministry of Agriculture, Food and Fisheries

CAIA

### **Possible Project Support:**

OCAD

Agriculture and Agri-Food Canada

DFO

CFIA

Environment Canada

## **Theme G- Food Safety**

### **PROJECT 2: DEVELOPMENT OF CHAIN OF CUSTODY ASSESSMENT GUIDELINES & STANDARDS**

#### **Background**

One of the keys to the development of an On -Farm Food Safety System is determining the appropriate chain of custody for shellfish aquaculture products coming from BC. Chain of custody refers to the complete production and marketing process (i.e. from site of origin to a processor, through the various distribution outlets to the marketplace). In this project it will be important to assess, monitor and acknowledge appropriate chain-of-custody procedures for shellfish aquaculture products coming from BC.

In addition to food safety and environmental management, a chain- of- custody procedure will also provide statistical information that can be used to accurately assess the economic status of the BC shellfish aquaculture industry. Verification of product origin will give assurance to fisheries regulators, resulting in increased certainty and support in the licensing of new species.

The maintenance of food safety and/or environmental standards rests on the accuracy of product handling and the accountability of product custody. It is essential that the shellfish aquaculture industry determines and implements an appropriate chain of custody procedure. To be effectively implemented, the system needs to be simple, straightforward and applied consistently across the industry.

#### **Project Objective**

*To develop and implement a chain- of- custody for shellfish aquaculture products coming from BC*

#### **Project Components**

The development and implementation of a chain –of- custody will involve a number of various steps and components:

#### **External Review**

A review of international guidelines for existing chain- of- custody assessments (agri and aqua food) could provide appropriate models for consideration in BC (i.e. Forest Stewardship Council accredits forest companies who follow *SmartWood* chain of custody procedures). Shellfish aquaculture certification may evaluate the practices of both growers and processors according to environmental and food safety standards. Chain of custody certification would assure consumers that the farmed shellfish products they buy meet food safety and environmental standards.

### **Industry Consultation & Agreement on Process**

A key aspect of this project would be to organize an industry workshop, with key representatives from the production and processing sectors. Possible chain –of- custody models could be presented for critique and discussion.

### **Development of Record Keeping System & Implementation Plan (i.e. chain- of- custody forms and manual)**

Once the chain -of -custody procedures had been agreed to by industry, the required forms and manuals would then need to be developed to support the system and provide a key piece of industry information for existing and future training courses.

### **Industry Training & Compliance**

Finally, industry training would form the final link in the program, ensuring that all industry participants understood the process and had plans to integrate the chain of custody process into their own operations.

### **Project Lead:**

CSR

### **Possible Project Support:**

BCMAFF

Agriculture and Agri- Food Canada

DFO

CFIA

Industry Canada

## **Theme G- Food Safety**

### **PROJECT 3 : ASSESSMENT OF NEW TECHNOLOGIES AND APPROACHES FOR SANITARY SURVEYS AND BIOTOXIN MONITORING PROGRAMS.**

#### **Background**

The operation of the current biotoxin and sanitary monitoring systems and the configuration of the services have resulted in considerable and often unnecessary business planning costs, diminished revenues, lost opportunities, cash flow problems and difficulties in maintaining markets and customers. Alternatives for a new cost-effective approach must be explored and tested to enable the shellfish farming industry to prosper and grow while ensuring public safety is maintained or improved.

Protecting human health and safety through effective sanitary and biotoxin monitoring programs is of paramount importance in supporting the development of a shellfish industry based on filter feeding molluscs. However, resulting closures can have devastating affects on business viability as they interrupt harvesting, turn-off cashflow and result in lost markets. The BC shellfish industry currently works with the Canadian Food Inspection Agency and Environment Canada who are charged with delivering federal regulatory monitoring programs. All groups admit that there is significant room for improvement in the methods and the delivery of the programs.

Another factor affecting industry development in BC is that current water quality and biotoxin monitoring programs do not adequately cover the entire BC coast and therefore, prevent shellfish industry expansion to those areas where coverage is missing. This is especially critical as shellfish aquaculture can provide much needed job opportunities, while many First Nations in the Central and North Coast areas are currently in the planning stages for establishing shellfish aqua-businesses.

To develop a world-class shellfish industry in BC it is necessary to have coast-wide coverage utilizing world-class technology in monitoring programs that address human health and safety concerns, while minimizing interruptions to shellfish operations. Water quality monitoring for faecal contamination is based on science developed in the 1930's. Recent advances in science offer opportunities for improvements. Biotoxin monitoring has made some remarkable advances in the 1990's and Canada's Institute for Marine Biosciences (IMB) in Halifax is the world leader in this field. New technologies and new methodologies may provide some solutions to these key issues in BC.

#### **Project Objective**

*Provide a comprehensive assessment of new technologies and approaches for sanitary surveys and biotoxin monitoring programs for future investigation and potential integration into regulatory programs.*

#### **Project Lead:**

CSR



**Possible Project Support:**

CFIA  
WD  
BCMAFF  
AquaNet  
DFO  
EC  
TNAC  
AAFC

**Theme G- Food Safety**

**PROJECT 4: CAPACITY BUILDING FOR BIOTOXIN MONITORING**

**Project Objective**

*To build capacity for biotoxin monitoring in BC. through the transfer of the IMB technology to the Applied Environmental Research Laboratory at Malaspina University – College.*

**Project Lead:**

CSR

**Possible Project Support:**

CFIA  
WD  
BCMAFF  
AquaNet  
DFO  
EC  
TNAC  
AAFC

## **Theme G- Food Safety**

### **PROJECT 5: PREDICTIVE AND REAL TIME MONITORING OF HARMFUL ALGAL BLOOMS IN BC**

#### **Background**

The negative impacts caused by Harmful Algal Blooms resulting in biotoxin closures can be mitigated to some extent through advance notice. Phytoplankton monitoring programs, as an early warning system, have been implemented in Quebec and Prince Edward Island.

Phytoplankton monitoring has also become a key component of regulatory monitoring programs in Maine, California, New Zealand and the EEC. Lack of phytoplankton monitoring in BC may result in barriers to future trade, as these programs are required by receiving countries (for example the EEC). Advanced techniques, including a combination of phytoplankton and oceanographic monitoring satellite imagery, remote sensing and stakeholder involvement to track harmful blooms, are being tested in Washington and Oregon States (ORHAB Project). One of the key sampling areas in this project is located off the BC coast, but BC is not involved.

It is in the best interests of the BC shellfish culture industry to develop linkages between international and academic oceanographic programs, which are developing new methodologies and techniques for predictive modeling and forecasting of Harmful Algal Blooms.

#### **Project Objective**

*To investigate and develop capacity for predictive and real time monitoring of Harmful Algal Blooms in BC*

#### **Project Components**

- Investigate the opportunity for BC to participate in the ORHAB project.
- Develop linkages with FOC' Institute for Ocean Sciences in Sidney BC and North Coast Biotoxin Monitoring Program and US Researchers operating in the Pacific Northwest.
- Increase coordination between industry, CFIA and analytical and research laboratories
- Conduct oceanographic investigations to develop long-term predictive ability for Harmful Algal Bloom events.

#### **Project Lead:**

CSR

**Possible Project Support:**

CFIA  
WD  
BCMAFF  
AquaNet  
DFO  
EC  
TNAC  
AAFC

**Theme G- Food Safety**

**PROJECT 6: ASSESSMENT OF PHYTOPLANKTON MONITORING PROGRAMS IN BC**

**Background**

Phytoplankton monitoring does not occur in BC for the shellfish industry, although a “plankton watch” program is in place for the finfish aquaculture industry that targets Harmful Algal Blooms (HABs) (e.g., *Chaetocerus* and *Heterosigma sp.*). A phytoplankton monitoring program (PMP) for shellfish is conducted in California and satellite imagery for the use of tracking harmful algal blooms is being investigated in Washington State.

PMP’s have been established in Nova Scotia, Prince Edward Island and Quebec as supplements to sentinel species monitoring for Biotoxin events. The North Coast Water Quality and Biotoxin Society in Prince Rupert has undertaken preliminary work in establishing phytoplankton monitoring on the North Coast of BC. The BC North Coast preliminary work has also shown that phytoplankton monitoring can provide an early warning of biotoxin events before it is noted in sentinel species.

PMP’s cannot then be viewed as a replacement for sentinel species meat sampling but as an added level of security and a potential farm management tool. From an industry perspective, a PMP is seen as a necessity, which meets a number of industry priorities (beyond the primary one of consumer safety) such as product conservation, improved operational efficiencies, documented quality assurance, timely expansion of production and differentiation (by inspection agencies) of product from that of wild fisheries.

PMPs may become an export regulatory requirement for shellfish intended for the European Economic Union. The EEC Council Directive 91/492/EEC states that

*“A public health control system must be established by the competent authority in order to verify whether the requirements laid down in this Directive are complied with. This control system must include: .....  
.....(c) **check the possible presence of toxin-producing plankton in production and relaying waters and biotoxins in live bivalve molluscs;...**”.*

Countries such as Ireland and New Zealand have recently modified their monitoring programs in

order to comply with this directive.

**Project Objective**

*To assess the cost/benefit of developing and operating phytoplankton monitoring programs in BC by examining BC capacity as well as Canadian and international examples. In addition, the project will make recommendations for format and implementation of phytoplankton monitoring programs in BC.*

- *Develop capacity for phytoplankton monitoring in BC within the scientific community and industry*
- *Implement phytoplankton monitoring programs in BC*

**Project Lead:**

CSR

**Possible Project Support:**

CFIA

WD

BCMAFF

AquaNet

DFO

EC

TNAC

AAFC

## **Theme G- Food Safety**

### **PROJECT 7: IMPROVING ANALYSIS AND DISSEMINATION OF CURRENT AND HISTORICAL MARINE BIOTOXIN DATA**

#### **Background**

Although historical marine biotoxin data has been provided in technical report format (often years after it was recorded), there does not exist an accessible analysis of historical data on marine biotoxin activity in BC. Past laboratory data, however, is largely available in electronic format and may be readily assessed and analyzed.

Summary information on marine biotoxin history is important in predicting events, allocating monitoring resources and in business planning for shellfish farmers. Ideally data should be readily available and updated as results become available. Access to up to date information regarding historical and current biotoxin data has identified as a high priority by industry.

#### **Project Objective**

*To work with CFIA to provide an analysis of historical BC marine biotoxin data in a format that can be readily accessible and updated regularly.*

- *Develop mechanisms to make historical analyses and current data available to regulatory, research and industry communities through advanced information technologies.*

#### **Project Lead:**

CSR

#### **Possible Project Support:**

CFIA

WD

BCMAFF

AquaNet

DFO

EC

TNAC

AAFC

## **Theme G Food Safety**

### **PROJECT 8: IMPROVING SANITARY SURVEY PROGRAMS IN BC/CANADA**

#### **Background**

Monitoring water quality for faecal contamination (sanitary survey) is a critical issue as urbanization and associated effects on water quality continues. By 2000, there were approximately 105,000 hectares closed to harvesting of shellfish in BC., nearly double the area covered by closures in 1976 (63,000 Ha.) (Environment Canada, date). The science of faecal contamination identification has progressed since 1930's when the current protocols were established. Refinements based on new science holds the promise of, not only protecting human health and safety but, refining the number and duration of closures, dramatically improving the climate of business certainty for shellfish farmers and identifying situation specific methods and strategies for targeted remediation of impacted marine waters.

It is recognized that current protocols are established by national and international agreements; these agreements would have to be changed to reflect advances in science such as Bacterial Source Tracking (BST) technologies. Therefore, this is a long-term project with high strategic value because the impact caused by harvesting closures is one of the main impediments to shellfish industry development over the long-term. Certainty of supply to the marketplace is fundamental to long-term success of the industry. This can only be achieved by minimizing, to the greatest degree possible, the frequency and duration of harvesting closures. The current methodology and programs do not achieve this objective.

#### **Project Objectives**

- ❑ *To complete a review and assessment of scientific advances in the identification of sources of faecal contamination and their potential application to water quality monitoring programs in Canada.*
- ❑ *To investigate and develop capacity in BC for Bacterial Source Tracking methodologies (i.e. genetic fingerprinting of bacterial pollution sources).*

#### **Project Lead:**

CSR

#### **Possible Project Support:**

CFIA

WD

BCMAFF

AquaNet

DFO

EC

TNAC

AAFC

## **Theme H- Business Development**

### **PROJECT 1: BENCH MARKING AND ECONOMIC ANALYSIS OF SHELLFISH AQUACULTURE PRODUCTION**

#### **Background**

Accurate business planning, investment attraction and obtaining commercial financing all require that accurate information about the costs and returns of operating a commercial shellfish business are known. At present, data is not available in the public realm that could be accurately used by a prospective shellfish culturist or investor to make educated decisions about the advantages or disadvantages of various shellfish culture practices, economies of scale etc. Economic analyses of the existing industry would allow for benchmarking of farm performance against aggregate industry data to assess projected and current farming operations.

Results from this project would assist business planning on existing and new farm operations, improve access to traditional lending, provide investor confidence and help develop a sound framework for shellfish aquaculture business training course development.

#### **Objective**

*To conduct an economic assessment of various culture methodologies in use on existing farms to determine an aggregate baseline of the costs and returns of various types of shellfish culture.*

#### **Project Components**

- Economic analysis of existing farming operations
- Determination of business models for farm operations
- Sensitivity and weighting analysis of variables which affect profitability of farming operations
- Representative industry benchmarks for use in evaluating farm performance

#### **Project Lead:**

CSR

#### **Possible Project Support:**

FCC

WED

BCMAFF

Ecotrust

VIEDA

## **Theme H- Business Development**

### **PROJECT 2 PHASE I: DEVELOP A MARKETING PLAN TO ATTRACT OUTSIDE INVESTMENT TO THE BC SHELLFISH INDUSTRY**

#### **Background**

The BC shellfish industry needs to attract private sector investment. The current industry lacks profitability and faces considerable barriers to attracting capital:

- ❑ Growers do not have assets for loan collateral
- ❑ Crop insurance is lacking
- ❑ Growers do not have business relationships with processors to guarantee sales when crops are harvested
- ❑ Government does not participate in direct business financing

Independent analysis shows that the industry has large growth potential. Capital is required for the industry to reach that potential, yet traditional capital sources will not support the industry at current levels of risk. The industry must look to innovative investors and prepare marketing materials and strategies to attract investment from non-traditional sources.

Investment capital is absolutely necessary to grow the industry, and increase farm productivity. To reach the targets of “\$70 million in 5,” investment marketing to attract capital must take place.

#### **Project Objective**

*To market the BC shellfish aquaculture industry to outside investors with the goal of raising capital to allow increased production, processing and marketing efforts.*

#### **Project Components.**

- ❑ Develop a marketing plan to attract investment to the shellfish industry from local, national and international sources. This will involve identification of prospective investors and understanding their needs.
- ❑ Understand the product offering.
- ❑ Identify marketing channels.
- ❑ Identify key messages.
- ❑ Set budget and timeline for implementation.



## **PROJECT 2 PHASE II: IMPLEMENTATION OF INVESTMENT MARKETING PLAN**

### **Project Objective:**

*To implement the marketing plan, attract investment and grow the industry.*

### **Project Lead:**

VIEDA

### **Possible Project Support:**

MAFF

WED

Rural Partnerships Canada

MSRM

IC

## **Theme H- Business Development**

### **PROJECT 3: RESEARCH AND DEVELOPMENT INTO SHELLFISH AQUACULTURE PRODUCTION TECHNOLOGIES**

#### **Background**

Funding for production research into existing species has historically been low and culturists have not been able to realize the full scope of production efficiencies that will produce a competitive industry. Shellfish growers themselves have primarily conducted most of the research and development into improving shellfish culture technologies for existing species, usually in an ad-hoc manner. As a result, much of the underlying science of why production methodologies succeed or not are unknown and successes are not well communicated to the rest of the industry. Much work needs to be done to develop more efficient techniques for culture of new and existing species in BC.

#### **Objective**

*To conduct projects which examine and develop improved culture methodologies in order to enhance the efficiency and competitiveness of the industry while maintaining goals of industry sustainability.*

#### **Project Components**

- ❑ Production technology research
- ❑ Benchmarking production techniques
- ❑ Technology transfer to industry

#### **Project Lead:**

CSR

#### **Possible Project Support:**

BCMAFF

Industry

## **Theme H- Business Development**

### **PROJECT 4: REVIEW BEST PRACTICES IN AG/FOOD MARKETING (DOMESTIC & INTERNATIONAL)**

#### **Background**

The BC shellfish aquaculture industry has traditionally been production driven rather than market driven. To enhance the market sophistication of the industry, it is critical to better understand existing marketing channels and potential alliances that could be formed to expand sales. In addition, a coordinated approach to marketing activity is also recommended to benefit the whole sector.

Other industries in BC have formed successful industry/government partnerships in marketing to benefit the entire industry. Industries such as wine, dairy, and tree fruits have come together to form business partnerships in marketing to benefit growers. Similarly, other shellfish producing jurisdictions such as Prince Edward Island and New Zealand have effective sophisticated marketing alliances.

#### **Project Objective**

*To recommend marketing alliances and structures that might work to advance the BC shellfish aquaculture industry, based on a review of best practices in shellfish/seafood and other food industry marketing.*

#### **Project Components**

1. Review marketing channels and alliances of seafood and other agri-food industries in Canada and in other jurisdictions where appropriate
2. Review current BC shellfish marketing channels and alliances
3. Provide options for consideration
4. Recommendations

#### **Project Lead:**

CSR  
BCMAFF

#### **Possible Project Support:**

Agriculture and Agri-Food Canada  
DFO  
OSA  
WD  
Industry Canada  
DFAIT

## **Theme H- Business Development**

### **PROJECT 5: COMMUNITY ASSESSMENT FOR SHELLFISH INDUSTRY EXPANSION**

#### **Background**

Local communities play a significant role in facilitating or discouraging the expansion of any industry. The approval and zoning processes can encourage or discourage industry development. Some communities can be “investment ready” by anticipating industry requirements and putting local regulations and processes in place to make industry expansion easier.

The shellfish industry has been welcomed by some BC coastal communities, but has been faced with barriers in others. This project is designed to review community processes and regulation to determine their acceptance of shellfish aquaculture, as well as to uncover barriers to industry expansion. Communities will be asked if they wish to participate in the project. Participating communities will also receive a template for best practices and recommended procedures to encourage shellfish investment and industry expansion.

#### **Project Objective**

- ❑ To perform an assessment of community readiness for shellfish industry expansion
- ❑ To rank major communities in BC as to their receptivity for shellfish industry expansion
- ❑ To develop a series of recommendations on what can be done at the community level to support expansion of the industry

#### **Project Components**

The project will ask the following key questions of each community, summarize responses and develop key recommendations:

##### **Existing rules**

- ❑ Existing community regulatory assessment.
- ❑ Review of community economic development strategy. Is shellfish a priority?
- ❑ Review of official community plans for support.
- ❑ Is there any evidence of support or disincentive for shellfish expansion or investment?

##### **Stakeholders**

- ❑ What is the local approval process for new farms, processing?
- ❑ What is the makeup of local stakeholders i.e. Islands Trust, and what is their position on expansion of local industry?

- What is the new tenure capability, physical ability and community receptivity.  
What local issues will impact investment and expansion of shellfish aquaculture?

**First Nations**

- Local FN position on shellfish industry
- FN existing and proposed activity.
- Local FN relationship with local government.
- Partnership potential.

**Project Lead:**

VIEDA

**Possible Project Support:**

BCMAFF

## **Theme H- Business Development**

### **PROJECT 6: ALTERNATIVE MODELS FOR INDUSTRY DEVELOPMENT IN REMOTE AREAS**

#### **Background**

There is an active provincial agenda for shellfish aquaculture development along the entire BC coastline. Over 35 of the 68 BC coastal First Nations, many of whom are located in remote communities, are investigating shellfish aquaculture as an economic development opportunity. At present, there are only two operating shellfish farms on the North Coast and they are both having significant difficulties. In addition to “normal” development costs, these farms have additional issues around infrastructure development as well as processing facilities and regulatory water monitoring.

However, informed industry sources are concerned that the margins with traditional species may not be sufficient to support the additional costs associated with independent business start-ups in remote communities.

A target question is: Are there alternative approaches that could be developed to assist in the objective of coastal community economic re-vitalization through shellfish aquaculture development?

To explore this, development options used in other countries will be reviewed and considered. For example, in order to encourage the development of Atlantic salmon farming in Tasmania, the Tasmanian government and a Norwegian company (Nor Aqua A/S) joint ventured the construction of an Atlantic salmon hatchery. The agreement was structured so that the government could divest itself of its holdings after a period of years.

#### **Project Objective**

This project will investigate examples of successful approaches to industry development and examine necessary components for promoting an environmentally sustainable, economically viable aquaculture industry in remote areas.

#### **Project Components**

This project will ask questions such as:

- What innovative methods or programs have been successfully used or may be used to encourage and support industry start-up and development? An international review will assist in answering this question.
- Are traditional aquaculture development approaches (South coast) appropriate for remote areas? If not, why not? When comparing the two approaches, what other

issues need to be taken into consideration?

- ❑ What are the necessary elements to encourage independent start-ups and investments such as critical infrastructure (e.g., docks and wharves), processing and transport infrastructure, regulatory monitoring programs, training programs etc?
- ❑ How can this come together for community or regional development strategies?
- ❑ What are the different business models that could be considered for industry development in a remote area? (e.g., Co-op, joint partnership with government)
- ❑ With specific consideration given to BC's North Coast, what types of infrastructure are already in place and what role can they play in future shellfish aquaculture development? This question would require an overview of existing processing facilities in the North Coast including interviews with management.

**Project Lead:**

CSR

**Possible Project Support:**

Community Futures in Prince Rupert

WD

Prince Rupert Economic Development Office

North Coast Water Quality and Biotoxin Society

Northwest Community College

Tsimshian Stewardship Council.