
SPAWNING AQUACULTURE

FACILITATOR'S REPORT ON THE NOVEMBER 23rd, 2005
STAKEHOLDER CONFERENCE

Final Draft



Manitoba Rural Adaptation Council Inc.
ADVANCING CANADIAN AGRICULTURE AND AGRI-FOOD



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EXECUTIVE SUMMARY AND KEY RECOMMENDATIONS

A group of approximately forty persons representing stakeholders of the Manitoba's Aquaculture sector met at the Radisson Hotel in Winnipeg, Manitoba, November 23rd, 2005 to begin assessing Manitoba's current opportunities and challenges for aquaculture as a potential diversification opportunity in rural Manitoba, conduct an initial assessment of the specific infrastructure requirements to enhance the sector and discuss an action plan to move the agenda forward. The meeting was sponsored by the Manitoba Rural Adaptation Council (MRAC) and Manitoba Agriculture, Food and Rural Initiatives (MAFRI).

A pre-conference questionnaire was completed by 28 of the attendees in which strengths, challenges, opportunities and threats were identified and infrastructure needs were assessed.

After much discussion, the group reached consensus on five major recommendations (some with sub-recommendations) as follows...

1. Formation of a Producers Association for the Aquaculture Sector

The group recommends that Manitoba aquaculture producers be supported and encouraged to create an association of producers. This association should be provided with some seed funding that would allow it to get up and running quickly. The association, once formed, would determine its own mission, goals and objectives but the group felt that it could take on responsibility for a number of functions including the following...

- Take on a leadership role for the industry and drive the expansion of the industry through the full value chain from production to processing, to marketing, quality control, distribution and beyond.
- Take on an extension role providing existing and new producers with assistance in getting started in the sector and growing the business. (There are many models where this function has been successfully performed by producers including the association for sheep farmers.)
- The association could take the lead in the development, promotion and maintenance of industry quality. It can promote quality through actions such as the adoption of the National Code of Practice, the development of Best Manufacturing Practices and the development Standard Operating Procedures as this is not only essential for quality control but is also a necessity for insurer and lender confidence.

- The association can work in partnership with MAFRI, educational institutions and the aboriginal community to help train and develop a workforce for the industry.

The form and structure of this organization was not discussed in detail.

2. MAFRI Becomes the Lead Public Sector Organization In Support of Aquaculture

The group recommends that the government of Manitoba declare its commitment to the development of an aquaculture industry in Manitoba and that Manitoba Agriculture, Food and Rural Initiatives (MAFRI) become the agency that has the lead role in developing this sector from a Public Sector perspective.

Among the early tasks and responsibilities that the group recommended MAFRI take on are the following...

- Make a public statement endorsing the intent of this recommendation.
- Develop a broad policy framework for the Aquaculture sector along with a supporting administrative structure to implement the policy.
- Support the creation of the producers association recommended above including the provision of some or all of the seed funding required.
- Pro-actively push the risk management and insurance agenda for this sector that is currently being considered by the council of First Ministers of Fisheries and Oceans especially in consideration of the fact that capital financing from private lenders for individual producers is highly dependent on the existence of reasonably priced insurance.
- Develop a “Made in Manitoba” industry support program similar to the “Pork Advantage” program for the hog industry.
- Develop an education and training capacity for the industry in partnership with the proposed Producers Association, the Educational Institutions, the aboriginal community and others and help fund the delivery of that training and education once the capacity is created.
- Use its existing veterinary services development mandate and funding to ensure that producers have access to veterinary services in Manitoba as required.

3. Provide A Clear and Comprehensive Regulatory Framework and Access to Technical Advice on Water Supply, Effluent Management and Other Environmental Issues

The group recommends that all existing rules and regulations that apply to the Aquaculture industry be consolidated and published in one easily-accessible source. This task has already been partially completed. Bruce Webb from Manitoba Conservation has agreed to complete it over the next few weeks. The results will be published on MAFRI’s website and will be

available in paper form. This information base will then be communicated to all those existing or potential producers who require access to it and to those whose role it is to provide technical information and advice on water supply, effluent management and other environmental issues.

4. Stocker and Inventory Financing

In view of the fact that access to capital is a key barrier to the growth and development of this sector the group recommends that MRAC take the lead in approaching Western Economic Diversification to develop a “stocker” and an “inventory” loan program as a means of helping to diversify the agricultural sector in Manitoba.

5. Develop Low Cost Feed Alternatives

In view of the fact that feed is the main cost in Aquaculture production, a minor reduction in cost can have a significant bottom line impact. The group recommends that the Producers Association recommended in item 1 above be encouraged to work with University Researchers to develop and produce a low-cost feed alternative for the aquaculture industry. Much work has already been carried out at the University of Manitoba and flax has been found to be an effective feed alternative and Manitoba is major flax producer. Funding to carry out this research and development could be provided by MRAC.

Short-Term Action Plan

The group also agreed to a short-term action plan to move this agenda forward. The following key initial steps were recommended....

Step 1. A report on the outcomes of this conference will be provided in draft form by the facilitator.

Step 2. Draft report will be reviewed by MRAC and MAFRI and revised as required.

Step 3. A final version of the report with appropriate appendices will be produced and distributed to participants.

Step 4. MRAC and MAFRI will produce a responsibility table and a timetable for the implementation of the key recommendations coming from the conference along with a monitoring and reporting process.

Step 5. The Manitoba Government will be asked to formally endorse recommendations from this conference and provide a timeframe within which it will act on those recommendations that specifically apply to MAFRI.

1. INTRODUCTION AND BACKGROUND

This document is a report on the results of a planning session involving all stakeholders of the Manitoba's Aquaculture sector. The sponsors for this session were Manitoba Rural Adaptation Council (MRAC) and Manitoba Agriculture, Food and Rural Initiatives (MAFRI). The meeting was held at the Radisson Hotel in Winnipeg, Manitoba, November 23rd, 2005. An agenda for this session can be found in Appendix 1 in this report along with the list of confirmed participants in Appendix 2.

The invitation to attend the conference contained the following paragraphs.

*“As a leader in Manitoba's agriculture and business community **you are invited** to participate in an MRAC-funded aquaculture strategic workshop entitled Spawning Aquaculture, November 23, 2005 at the Radisson Hotel Downtown in Winnipeg.*

Aquaculture has the potential to be a valuable diversification opportunity to enhance the agricultural economy in rural Manitoba. There are many parallels between the needs of aquaculture and agriculture, as well as many opportunities to integrate both sectors.

The ultimate goal of the Spawning Aquaculture workshop is to bring together stakeholders for a facilitated discussion to initiate a strategy that will nurture aquaculture as an agricultural diversification tool in Manitoba.”

GOALS: The purpose of the session was...

1. To begin assessing Manitoba's current opportunities and challenges for aquaculture as a potential diversification opportunity in rural Manitoba.
2. To conduct an initial assessment of the specific infrastructure requirements to enhance the aquaculture sector in Manitoba
3. To discuss an action plan to move the agenda forward.

HOPED FOR OUTCOMES:

1. A prioritized list of current and potential strengths of Manitoba with respect to this sector.
2. A prioritized list of the major challenges facing the sector in Manitoba.
3. A list of recommendations with regard to several infrastructure areas including but not limited to accessibility to credit, safety nets, feed sources, regulation and environmental issues, technical resources, training and genetic development.

4. An action plan showing key steps required, when they need to be completed and who will be responsible for carrying them out.
5. A proposed ongoing implementation mechanism to ensure that something happens.

2. TAKING STOCK OF WHERE THE INDUSTRY IS TODAY

In this section we look at the state of the industry today. A pre-conference survey was used to gather participant input to some questions that would help take stock of where we are now. In addition, three speakers helped set the stage by giving their impressions of the industry as it is today as well as their recommendations for its future development and direction.

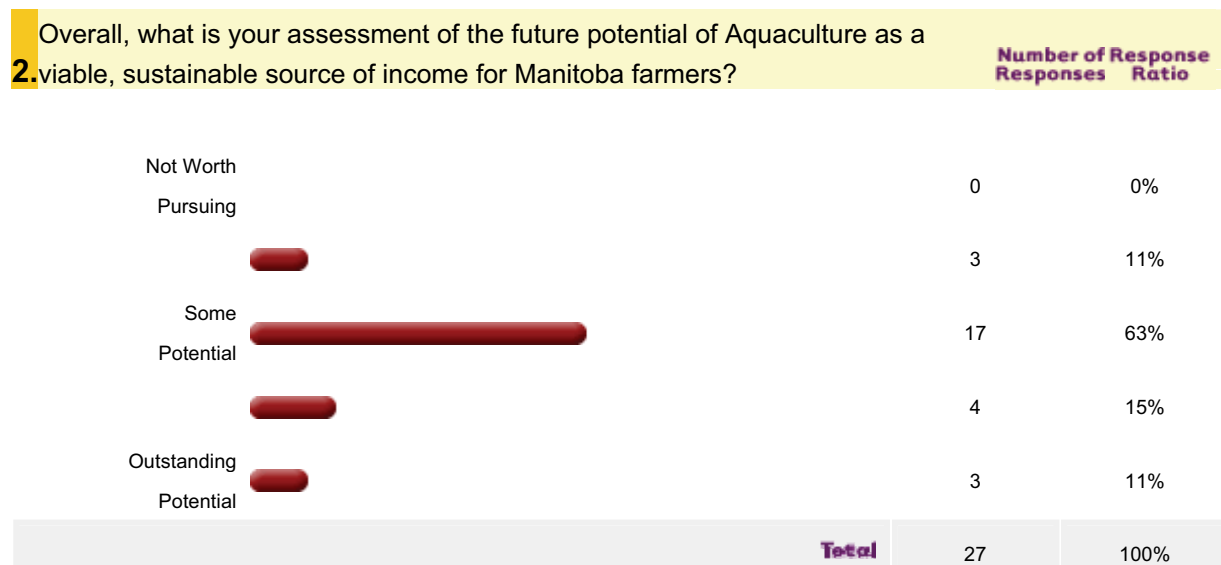
SETTING THE STAGE

Linda MacNair, a member of the Executive Committee of the Board of MRAC and acting Executive Director opened the session and introduced the three speakers who were asked to help set the stage for the deliberations of the group. These presentations provided some insight into current roadblocks, opportunities and challenges that exist for confined tank aquaculture in Manitoba. Each of the speakers presented a different perspective on the current state and future direction of the sector. The presenters were...

- Les Routledge, a consultant with Prairie Practitioners Group, presented the findings on an aquaculture study commissioned by Turtle Mountain Sustainable Ventures, an economic development group made up of local governments, agricultural producers, business representatives, and citizens from southwestern Manitoba. With the assistance of a contracted consultant, this group has crunched some serious numbers in an attempt to get a handle of the financial feasibility of adding confined tank aquaculture to an existing farm operation. A copy of the full results from this study can be accessed from the MRAC office at (204) 982-4790
- Dr. Terry Dick, a professor with the Department of Zoology at the University of Manitoba, who told everyone about the remarkable pioneering history of research into this field that goes back many years at the U of M. He provided a list of ingredients that he feels are critical to launching (or re-launching) the sector and to build on the solid base of competitive assets that Manitoba has.
- John Bottomley, a Manitoba producer, gave the perspective of someone who actually operates an aquaculture business in Manitoba. He expressed the view that from the economic and technical perspective there is no reason why Manitoba could not have a viable aquaculture industry. What is missing, in his view, is the will to build the supports and infrastructure to make it happen.

Copies of their presentation slides are available on the MRAC website at http://www.mrac.ca/index.cfm/fuseaction/news.article/article_ID/C32B5B75-F4B4-6EF4-A6C32502E8A61549/index.html .

We asked participants to provide a sense of what the prospects are for the industry in Manitoba. Here is how they responded to the pre-conference questionnaire.



When asked to support their assessment, those who were hopeful for the sector mentioned factors such as... *our abundant water resources, our low cost energy, growing demand, the need to diversify in agriculture and rural Manitoba, and changing diets.* For those who were less optimistic the concerns expressed were...*lack of infrastructure, high costs of feed and a questionable return on investment.*

Among the hoped for outcomes of the conference were a list of current and potential strengths of Manitoba with respect to this sector and a list of the major opportunities and challenges that it faces. There was considerable agreement and overlap in the presenters’ assessment of where we are now and what is needed to move on. Their assessments were also consistent with the picture that emerged from the pre-conference survey.

MANITOBA’S STRENGTHS RELATIVE TO AQUACULTURE

The following items come directly from the pre-conference survey in response to the question “Please identify in the space provided, what strengths you think Manitoba has that might help develop a sustainable Aquaculture industry.”

- Abundance of fresh water, relatively low cost energy, farming expertise, requirement to diversify agriculture, existing processing plant in Winnipeg
- Agriculture sector looking to diversify
- Abundance of water, central location in terms of markets, natural species
- Former gravel Pits(Bore Pits), vacant PMU/Hog barns that could be converted to indoor aquaculture facilities.
- We have lots of fresh water and some indigenous species that are high value if slow growers.

- ❑ Water for aquaculture, experience in fish processing.
- ❑ Good trucking links to major US markets
- ❑ Manitoba has some processing capacities through the Fish Marketing Corporation, private companies, and product development capabilities (Food Development Centre, University of Manitoba).
- ❑ Middle of North America
- ❑ Many residents are fish eaters, strong economy
- ❑ Research base flax - NGO support
- ❑ Manitoba's geographic location to a huge market in the USA. Winnipeg is a major air cargo center, which could be a benefit for exporting, processed fish. Huge volumes of high quality ground water in many parts of Manitoba especially the Eastern- Interlake region. Reasonable Hydro rates compared to the majority of the provinces in Canada. There is a lot of expertise in the wild fishery in Manitoba that may indirectly be of benefit when it comes to processing of fish. FFMC marketing expertise and processing technology may benefit Manitoba's aquaculture industry. DFO's head office for the prairies is located in Winnipeg at the UoM Campus. DFO has lots of expertise in aquaculture that should be tapped into to benefit Manitoba.
- ❑ Diversified animal husbandry experience coupled with a dedicated environmental sustainability culture.
- ❑ Water, land, suitable buildings, need to supplement farm income, disease barriers
- ❑ With R&D and new process technology, should have fish quality feed available, and at low cost.
- ❑ Cold water
- ❑ Adequate water supply, access to economic power source, entrepreneurial nature of producers, unused/underused buildings available for alternate use (i.e. PMU barns, community rinks, etc.), government support, central market access location
- ❑ Ample supply of fresh water in the Interlake region and potential for cage culture in many lakes
 - Good and plentiful sources of water - potential feed sources from various agricultural products
 - knowledge base regarding fishing - 2 university faculties with established food and nutrition testing capabilities
- ❑ Inexpensive feed source. No bad habits. Isolation for disease control
- ❑ We have ample supplies of good water, good transportation systems, proximity to a large U.S. population whose fish imports are increasing, farmers with good management and animal husbandry skills, and in some cases (PMU industry) suitable buildings that can be adapted with relatively little remodeling.
- ❑ Our biggest strength will be the willingness and enthusiasm of producers to be open to new opportunities. Traditionally, Canadian producers have been a little wary, but, once convinced, we embrace new opportunities. i.e. canola
- ❑ -Diversified agriculture, land, water, ready access to transportation to markets
 - Experience with developing markets - potential to develop suitable feeds using existing local feed stuffs
- ❑ Access to considerable technical advice from university/DFO (Freshwater Institute) sources
- ❑ Land available, water sources, perhaps capital sources that may already exist.
- ❑ Access to former PMU barns, good central location for distribution to US and rest of Canada

THE MAJOR CHALLENGES FACING THE SECTOR IN MANITOBA

The following items come directly from the pre-conference survey in response to the question *“Please enter in the space provided, what you think are the major challenges that need to be overcome in order to build the Aquaculture industry in Manitoba.”*

- Market development, financing, practical experience
- Perseverance. the expenditures will probably exceed the revenues for the first year(s)
- Lack of knowledge
- Limited education facilities for aquaculture. Convincing people to invest in trying a new sustainable development. Transportation to markets.
- it is more un-natural than swine farming so expect some flack from that end. There are no drugs approved to treat infectious disease in fish or nearly none. There is no way to prove that waste- water is not 1000% safe for the environment.
- water supplies not uniformly available, wastewater issues, capital investment for equipment unrelated to other agricultural enterprises.
- Absence of local feed supply. Lack of trained work force Inadequate risk management instruments. Absence of specialized input services Limited extension support. Limited availability of debt financing. Uncertain environmental requirements and standards
- Establishing the needs and demands; hence market development for the products.
- Costs
- Building markets for aquaculture species
- Economics
- The lack of a safety net for aquaculture. The limited access to financing for term loans and operating loans for a fish farm. There are no model fish farms currently in Manitoba that is using leading edge water re-circulation technology. There is a lack of knowledge in aquaculture in Manitoba. We need a training and demonstration center to train potential fish farmers and to show what it takes to raise fish in a tank culture. There are no safety nets in place for aquaculture. There is no made-in-Manitoba fish feed as a result it all has to be imported from either Ontario or B.C. The cost of Fish Feed at \$1400 to \$1500 per tonne is a major factor for the very narrow margins in aquaculture
- Regulatory: Industry currently falls under Fisheries and Oceans rather than Agriculture and Agri-Food Canada. Programs tend to target salt-water cage aquaculture rather than inland freshwater raceway (vat) aquaculture.
- Education, education.... Government support
- Small markets nearby, so must freight a frozen, heavy product to market.
- Production skills, adequate and consistent supply to maintain market share, venture capital
- The financial risk and lack of a critical mass of producers along with support services such as vet expertise, along with lack of a demonstration/training facility make the investment a questionable risk
- Distance from markets - limited public use of fish locally - climate
- Marketing, Cost of production, lack of existing infrastructure, knowledge base

- ❑ Challenges include the lack of access to capital and operating credit, the need for more support services such as veterinary and technical, and the cost of transportation of feed from coastal suppliers.
- ❑ Producer resistance.
- ❑ -Lack of knowledge and skills, lack of financial backing, lack of insurance programs
- ❑ Producing sufficient tonnage to serve a market - processing capacity - training of workers
- ❑ No organized aquaculture association; difficulty in accessing financing/insurance; competition with major wild commercial fishery; little market research
- ❑ High-energy costs to maintain intensive culture, or tank operation, feed source - market is not close.
- ❑ Establish profitability, financing, lack of experience in industry

EMERGING OPPORTUNITIES

The following items come directly from the pre-conference survey in response to the question, *“As you look forward, do you foresee any major developments that might positively impact the future of Aquaculture in Manitoba? If so, what are they?”*

- ❑ Aquaculture can be very energy intensive. Capitalizing on Manitoba's low cost electricity and energy efficiency initiatives
- ❑ Continuing demand for reasonably priced protein
- ❑ Loss of natural fishing
- ❑ Establishment of a sector development plan supported by all stakeholders
- ❑ Increased demands for fish products as consumers become more aware of fish as healthy alternatives.
- ❑ Salmon decline in other parts of the country
- ❑ Need for alternative sources of fish feed consumer demands for fish functional food aspects of n-3 enriched aqua products
- ❑ I see a lot of interest in aquaculture from organizations like MRAC and MAFRI (Its one of their priorities and it has been put in their mandate) that wasn't there a couple years ago. There are development corporations like the TMSV group that are taking the lead in getting aquaculture opportunities looked at in Manitoba. Cage culture work that DFO (Dr. Cheryl Podemski) is doing in freshwater lakes in the Experimental Lakes east and south of Kenora is going to have a positive impact in cage culture happening in Manitoba.
- ❑ Decline of PMU industry, consolidation of other livestock production (hogs, dairy, poultry) will free up some barn space which might be converted to aquaculture production.
- ❑ The world needs a cheap reliable, consistent, protein supply. Wild stocks will continue to decline while demand will increase. Disease problems in other meat supplies will increase demand.
- ❑ R&D and new process technology for feed, as above. Also, waste heat technology would create an opportunity and potentially new species.
- ❑ Significant private sector interest
- ❑ Growing market share for fish protein-dwindling natural sources, farming youth with a desire for diversification,
- ❑ No. Positives such as decreasing fish stocks and increasing markets are not unique to Manitoba.
- ❑ Growing Asian immigrant population - recognition of positive role fish can play in a healthy diet

- ❑ Creation of a safety net system to backstop major losses from disasters could encourage lending agencies to become more receptive. Development of plant based feed formulations could result in locally grown feedstock's, reducing cost of transporting feed and providing a new market for the grains and oilseeds industry. The continued increase in consumption, and the apparent acceptance of farmed fish by consumers is encouraging.
- ❑ Aquaculture be put under the umbrella of Agriculture.
- ❑ Continued problems in other ag ventures are forcing producers, entrepreneurs to look for other business ventures; cheap and available feedstock's from the commercial fishery industry; synergies with the existing MFWFMC
- ❑ Increasing demand for fish because of the health benefits as a food
- ❑ Possibly partnering with other industries (e.g. Turtle Mountain Ventures) to build a demonstration farm and determine the economic viability once and for all.
- ❑ Partners with other groups to develop the industry.
- ❑ BSE and bird flu concerns may have some consumers looking for alternative protein source

EMERGING THREATS

The following items come directly from the pre-conference survey in response to the question, *“As you look forward, do you foresee any major, emerging threats that might negatively impact the future of Aquaculture in Manitoba? If so, what are they?”*

- ❑ Market acceptance
- ❑ Disease
- ❑ Ability of other countries to produce at lower costs
- ❑ Quality of water
- ❑ Environment and the natural food movement may spell disaster from the get go.
- ❑ Non-scientific environmental regulations and standards Intervention by social-environmental activists
- ❑ Increased value-added processing (utilization) of waste fish (by-catch).
- ❑ Price of heating and labor
- ❑ Competition with other regions' funding
- ❑ The lack of an adequate credit policy specifically for fish farmers. The lack of safety nets for fish farmers. The lack of a training and demonstration fish farm or the fact there are no model fish farms for potential fish farmers to visit in Manitoba. The lack of research by DFO and the University of Manitoba. The change in DFO mandate away from aquaculture in 1996 with the closing of the Rockwood Hatchery at Gunton set the whole aquaculture industry back in Manitoba for many years. The failure of DFO in the 20 plus years it conducted research at the Rockwood facility to pass on the results to the farming community. DFO missed a glorious opportunity to put Manitoba on the map as leaders in fish farming.
- ❑ Marketing! We must be able to tap into the experience and expertise of the Freshwater Fish Corporation.
- ❑ Government subsidies.
- ❑ Not an emerging threat, but the biggest challenge is to obtain competitive priced feed, and find markets in which we can get a competitive advantage.

- ❑ Changing economic climate for aquaculture production, regulatory changes that may impact negatively, production input products (feed, breeding stock, "knowledge/skills"), market access
- ❑ Increasingly stringent environmental regulations along with public awareness of the work being done by the water stewardship people will make entry increasingly expensive and regulated
- ❑ Concern about contaminants in farmed fish -
- ❑ Continued lack of access to credit is a threat. Any food scare that might throw aquaculture into a negative light would be a problem. The failure to develop an adequate infrastructure and marketing plan for farm fish raised in Manitoba would eventually result in the demise of the industry.
- ❑ Feds' resistance to doing above.
- ❑ Failure of a model operation due to poor planning; introduction of neophytes too soon, too fast; negative interactions with DFO and environmental groups opposed to the industry
- ❑ Increasing costs of transportation in supplying fish to markets
- ❑ There have been a lot of failures to date in the industry.
- ❑ Border disputes, concentration of sales to US (as with Ontario)

The picture that emerges from this preliminary look at the sector is a mix of positives and negatives. On the positive side it seems that most agree that we have many natural advantages that could be exploited in the right environment. On the negative side there appears to be consensus that much is needed to create a positive climate within which this industry could grow and that we have not yet built the infrastructure that is required. We turn our attention to those factors in the next section.

3. BUILDING THE INFRASTRUCTURE

In this section we take a close look at the infrastructure needs of this fledging sector. The pre-conference questionnaire identified 12 infrastructure components and asked respondents to rate each on a five point scale intended to gather impressions on the importance of the component to the growth of the sector. Suggestions and recommendations for developing the component were also requested.

In the table that follows, the survey results are provided. The infrastructure elements are present in order of the average rating of the item from highest to lowest.

INFRASTRUCTURE PRIORITIES

The top percentage indicates total respondent ratio; the bottom number represents actual number of respondents selecting the option

RANK IS BY AVERAGE SCORE

	1 Nice But Not Essential	2	3 Important	4	5 Absolutely Critical	Not Sure	Average
1. Access to Credit RANK 1	0% 0	0% 0	7% 2	14% 4	75% 21	4% 1	4.70
5. Access to Marketing/Distribution Expertise/Resources RANK 2	0% 0	0% 0	11% 3	18% 5	68% 19	4% 1	4.59
3. Access to Technical/Production Expertise RANK 3	0% 0	0% 0	14% 4	25% 7	57% 16	4% 1	4.44
12. Access to Technical Advice on Water Supply, Effluent Management and Other Environmental Issues RANK 4	0% 0	0% 0	18% 5	29% 8	50% 14	4% 1	4.33
8. Access to a Reliable Source of Affordable Feed RANK 5	0% 0	4% 1	14% 4	32% 9	46% 13	4% 1	4.26
10. Training and Education RANK 6	0% 0	4% 1	18% 5	39% 11	36% 10	4% 1	4.11
6. Access to Processing Expertise/Resources RANK 7	0% 0	4% 1	22% 6	37% 10	33% 9	4% 1	4.04
2. Risk Protection/Safety Nets RANK 8	11% 3	4% 1	11% 3	25% 7	46% 13	4% 1	3.96

4. Access to Specialized Veterinary Services RANK 8	0%	4%	21%	43%	25%	7%	3.96
	0	1	6	12	7	2	
7. A Clear and Comprehensive Regulatory Framework RANK 8	0%	4%	36%	18%	39%	4%	3.96
	0	1	10	5	11	1	
11. Networking with other Producers RANK 9	0%	0%	32%	46%	14%	7%	3.81
	0	0	9	13	4	2	
9. Genetic Development RANK 10	0%	4%	32%	46%	7%	11%	3.64
	0	1	9	13	2	3	

MOVING TO ACTION

During the conference, six small groups of 6 or 7 persons each, were created and each was assigned 2 components from the above list. They were asked to discuss the assigned components and to recommend a course of action if possible or to recommend further inquiry if needed. They were asked to report on their discussion and recommendations to the full conference. The full conference was then asked to endorse the recommendations of the small group, suggest changes or additions, or set them aside for further consideration. The results of that process follow.

For each component, the suggestions/recommendations from the pre-conference questionnaire were provided as input and repeated here, the small group report to the conference is summarized, if the large group discussed the small group report, it is summarized and any formal recommendations are captured. The recommendations as stated in this section have been incorporated into the list of recommendations in the Executive Summary but may look different in the summary because of how we integrated them under some major themes.

1. Access to Marketing/Distribution Expertise/Resources

SURVEY COMMENTS AND SUGGESTIONS

- Availability of information on Marketing
- Need to establish linkages with existing operators
- FFMC has a lot of expertise in the marketing and distribution of wild fish. There are fish brokers in Winnipeg like Neptune Fisheries who have a lot of marketing expertise as well
- Without markets and customers being confirmed, a business cannot start.
- This is critical success factor that is often not well enough developed in new industries (witness ostrich, emu, wild boar). Without a reliable market, there is no point in pursuing the possibilities of this industry.
- No sense producing until the marketing angle has been sorted out
- Again there are producers raising fish in other provinces that have the expertise, we could learn from them

SMALL GROUP REPORT AND DISCUSSION

This group was the first to report thus it set the stage for much of the discussion that followed in other groups. The group reported many of the problems associated with marketing and distributing the products of small, new ventures somewhat removed from the mainstream of both production and consumption. The group concluded that three things are needed now..

- A. A producer-driven cooperative association that would take the lead in marketing and distribution with quality as its first concern.
- B. Single Desk market, and
- C. Branding

LARGE GROUP DISCUSSION

Because this small group was the first to report, the full conference had lots to say when they were finished. Several models from other sectors were raised and discussed including 'Peak of the Market' for vegetable producers, the single desk concept for hogs, the Fresh Water Fish Marketing Corporation for wild fish and farm gate selling. We discussed market-driven versus production-driven approaches. We discussed models from other jurisdictions. We looked briefly at the role of government and its role in risk management and financing. When all was said and done, we developed our first major recommendation from the conference.

RECOMMENDATIONS

The main recommendation that came out of this discussion is that marketing and distribution be driven by producers cooperating through an association. The importance of a producer driven association grew throughout the conference. Seed funding for this association to get it started off on the right track became important. MRAC may be the main provider of seed funding but we also talked about MAFRI. This association would take on a number of responsibilities for the industry. The list of responsibilities grew as we went from issue to issue. Among them were marketing, extension, quality assurance and the adoption of a National Code of Practice (this already exists), the creation of Best Manufacturing Practices, the creation of Standard Operating Procedures, Education and Training of Members, and so on.

2. Risk Protection/Safety Nets

SURVEY COMMENTS AND SUGGESTIONS

- Don't know what you mean. Don't think that anything is failsafe
- I doubt that this will get off the ground without either venture capital or government assistance which both have major risks. Refer to the "Elk" industry and the Crocus fund for examples.
- Absence of effective safety nets reduces access to debt financing
- There are currently no safety nets in place for aquaculture
- Business must be sound. If it is, these are not very important
- Development of a risk protection system would have the greatest positive effect on credit availability.
- Ditto- not recognized under current Fed/Prov program

- Inclusion in the crop insurance program is needed

SMALL GROUP REPORT AND DISCUSSION

The same small group was assigned another theme that came to dominate much of the further discussions. In this case it was the difficulty that producers have getting reasonably-priced insurance and access to safety-net programs and as a result, difficulty in getting loans to start up, operate and then expand their businesses. The link between risk insurance and access to capital was a theme of many presentations.

The group acknowledged that private insurers do not have actuarial data to determine an affordable premium because the experience base is so small. This leads to a classic ‘Catch 22’: without more experience to go on, it is hard to insure; without insurance it is hard to get into the business to develop the experience. How do you break the cycle? The group had two suggestions, first, government could be asked to “*Arm twist private insurers*” and second, “*Develop an information program for banks and farm lending organizations*”.

LARGE GROUP DISCUSSION

The large group added to the small group presentation. We were advised that the mechanisms are in place to start looking at this issue seriously. Studies have been undertaken for the Council of Ministers responsible for aquaculture and there are several options under consideration. The group quickly concluded that the Manitoba government needs to get more proactive in support of this initiative.

A second action suggested is that we have to work to develop on a systematic basis data to help create a risk profile for the industry on the prairies over the next 2 to 3 years. This is a task that could be part of the work of the Producers Association and/or part of a demonstration project.

RECOMMENDATIONS

The discussion of this issue led to the recommendation that the Province of Manitoba through its Minister of Agriculture become much more pro-active in supporting the National Council of Ministers.

3. Access To Credit

SURVEY COMMENTS AND SUGGESTIONS

- Financial Institutions view aquaculture as a high risk
- Limited access to debt financing will raise the cost of capital beyond the ability of the venture to produce a positive return
- MACC has to lead the way and put in special policies for term and operating loans for the aquaculture industry
- Must inform the broad financial industry of the potential, however, government needs to provide producers access to safety nets to enable start-up.
- Financing is available, but not easy to access for new ventures unless proven management, production technology and markets are available.

- ❑ I think this is one of the key barriers to development of this industry.
- ❑ Non-existent at the moment
- ❑ Need capital money to start

SMALL GROUP REPORT AND DISCUSSION

The small group looked at capital financing, receivables financing, input financing and working capital financing. They had suggestions in all areas but saw this largely as an area of further inquiry. Among their conclusions/suggestions were..

- ❑ Look at sources of receivable financing especially the Export Development Corporation
- ❑ The Financial institutions (e.g. Credit Unions) would finance this sector with loan insurance-guarantees from Government but Governments view this industry as too high risk for loan insurance. Why can't the government come out with a loan guarantee, there are a few loan guarantees out there? Capital financing, this is where the financing gets mingled into the risk management
- ❑ What about financing from input suppliers (e.g. contract feeding)?
- ❑ Working capital is available through an all-purpose loan if someone has assets to back it up.

LARGE GROUP DISCUSSION

The full conference quickly jumped into this important area with a great deal of discussion about loan guarantees and absolute necessity to have a solid risk insurance program in place to back them up. We heard that a great deal of work has been completed for the Council of Ministers of in this field and that they are in the process of considering some options.

There were comparisons made to other industries especially the hog industry and to other parts of the country where aquaculture has flourished. There was discussion about the evolution of full service companies in the hog industry that financed many producers and bought a piece of the action. Gradually they owned many of the producers and the industry profile changed dramatically from thousands of small producers to a few big ones. It worked to build the sector but do we want the same outcome for aquaculture some asked. We then talked about the necessity of a “stocker loan” program and who might provide it. The suggestion was made that if the role of Western Economic Diversification is truly to diversify the economy of the prairies this would be a natural fit.

The conference finally settled on a few key, high-priority areas where action is required.

RECOMMENDATIONS

The key recommendations that came out of this area were...

1. That the Manitoba Government becomes a pro-active supporter of the Council of Ministers work on Risk Management/Insurance for the Aquaculture sector (see also the recommendation from the group on Insurance above). There are sufficient loan guarantee programs out there that could work for aquaculture, given that the non-guaranteed portion of any capital loan is covered by reasonably-priced insurance.

2. That MRAC approach Western Economic Diversification to develop a loan program in support of this industry, which loans would cover stocking and inventories.

4. Access to Processing Expertise/Resources

SURVEY COMMENTS AND SUGGESTIONS

- More processing facilities
- The freshwater fish institute seems to be a pretty good resource
- Can be contracted to existing operations
- FFMC has incredible processing expertise and incredible processing technology. The wild fishery has produced a lot of expertise to process fish that would be available to the processing of farmed raised fish
- Depends on the species and product and market as to how critical this is. May be the easiest to train for.
- Goes hand in hand with the marketing and distribution expertise - you have to be able to process the product according to the demands of the consumer

SMALL GROUP REPORT AND DISCUSSION

The small group concluded that access to processing not a critical issue. The Freshwater Fish Marketing Corp. has a 200,000 lbs/day capacity and is willing to work with the Aquaculture industry. Other contract processing options are also available in other provinces. The large group supported the small group's conclusions.

RECOMMENDATIONS

The main outcome from this issue is that there is no particular action required at this time since there is adequate processing capacity to handle production for the foreseeable future.

5. Access to a Reliable Source of Affordable Feed

SURVEY COMMENTS AND SUGGESTIONS

- Do you contemplate feed subsidy?
- We need to grow and produce our own food sources.
- Is a potential source of competitive advantage in the future
- Dr. Terry Dick has done a lot of work on processing and developing fish feed using Manitoba grown products like flax. But once again the research has been slow in getting out to the agri-business arena and to the fish-farming sector. At current prices of fish feed and the high cost of transport we do not have affordable feed. We must investigate developing a made in Manitoba feed but we need to get aquaculture happening in Manitoba before the feed industry will get interested to meet the demand
- Has been one of the top challenges, because the major fish feed companies are separate from the livestock feed co's, and have proprietary research and process technology. And, all are currently located on the coasts.

- ❑ This component speaks to profitability - if we can develop a locally produced high quality feed source, the chances of success of this industry grow, and the integration between aquaculture and agriculture is enhanced.
- ❑ The potential for using flax, canola meal, DDG's and other locally available feed components is worthy of investigation
- ❑ Critical may have to look at alternate forms of compounds in feeds

SMALL GROUP REPORT DISCUSSION

The small group reported that this is an area that urgently requires more study leading to the development of a “Made-in-Manitoba” feed source using Manitoba-grown crops/product. (At the very least, we could collaborate with other Western Canadian provinces.) Feed is too expensive to import from East or the West coast and this is now further exacerbated by the recent jump in transportation costs. More than 60% of the input costs are from feed and this must be reduced to reduce impact on profitability.

Some of the study paths suggested include..

- ❑ Further study into plant protein substitution in fish feed (beyond 20%).
- ❑ Find ways to improve feed efficiency (energy), (genetics).
- ❑ Explore use of Underutilized Fish Species (UFS) from MB lakes.
- ❑ More study of nutrient profiles of UFS (protein, ash content of various species) Offal
- ❑ Form a purchasing co-op for lower-cost bulk purchasing.
- ❑ Consider opportunities from under-utilized feed mills.

LARGE GROUP DISCUSSION

The full conference endorsed the small group conclusion and added that there are organizations out there that would fund this research.

RECOMMENDATIONS

The main recommendation coming from this issue is that a producer group work with researchers to find less costly feed formulas probably with flax as a base. There is funding available for this activity from MRAC, Agriculture and Agri-Food Canada’s Matching Investment Initiative, and other sources.

6. Networking with other Producers

SURVEY COMMENTS AND SUGGESTIONS

- ❑ Its currently a small industry in Manitoba and its critical that the fish farmers lobby as an unified voice
- ❑ Partnerships with others.

SMALL GROUP REPORT AND DISCUSSION

This small group came to the same conclusion as some of the others, i.e. a producer group is an essential component of whatever strategy emerges for this sector. They see its role to include..

- ❑ Lobbying for R&D, training etc.
- ❑ Support network/information sharing
- ❑ Identification of workshops, info-sharing opportunities
- ❑ Networking with first Nation communities, perhaps as a source of investment, financing and job opportunities.

RECOMMENDATIONS

This group supported the recommendation that emerged from other groups that a Manitoba-based producer association be created and provided seed money to accomplish a number of tasks. This group can be a sub-group of a larger Western Canadian group or it could start out as an independent organization in order to get a number of tasks completed quickly.

7. Access to Technical Advice on Water Supply, Effluent Management and Other Environmental Issues

SURVEY COMMENTS AND SUGGESTIONS

- ❑ Can be brought in as a contracted service
- ❑ Environment or Conservation have been accessible to the public to comment on the various permits and what's allowed and what isn't
- ❑ Water use and water quality issues are high on the priority of Manitoba's government, and a goodly percentage of Manitoba's citizens. This industry must develop in an environmentally sustainable way from the start to avoid negative consumer response
- ❑ We have lots of expertise in this province.

8. A Clear and Comprehensive Regulatory Framework

SURVEY COMMENTS AND SUGGESTIONS

- ❑ Environment plays a big role in raising fish in tanks when it comes to water discharge. Our provincial fisheries play a major role in licensing fish farms
- ❑ Clarification would help as almost all other food production falls under the authority of agricultural departments. Fish seems to be the major exception
- ❑ Not sure of the current problems caused by Regs.
- ❑ Important to work on this component as the industry develops. Important not to put too many unreasonably onerous regulatory barriers in place up front, or the industry will never get off the ground.
- ❑ Would be ideal to classify aquaculture as a bonafide form of livestock production under the auspices of MAFRI

SMALL GROUP REPORT AND DISCUSSION (note: the group that was assigned components 5 and 6 dealt with them as one topic.)

This small group was composed of persons with a great deal of knowledge about the two assigned topics. They quickly concluded that ...

- All of the required information on regulations, application process, contacts etc. needed by an existing or prospective producer exists but it is scattered and not easily accessible from one source.
- It would be a fairly straightforward task for one person to bring this information from DFO, MB Conservation, Water Stewardship etc. together into one package and then make the results of that collection easily accessible on-line and in hardcopy.

LARGE GROUP DISCUSSION

The full conference quickly endorsed the work of the sub group and applauded the volunteers who agreed to take on the task.

RECOMMENDATIONS

The main recommendation emerging from this issue is that one person (in this case, Bruce Webb from Manitoba Conservation) take responsibility for consolidating all regulations governing the Aquaculture sector and then ensure easy access to those regulations from one source. The main source will be through the MAFRI website and all links to all related sites will be provided. As a secondary source there will be a printed version of the same materials. This task is apparently a simple one and will be completed over the next few weeks. Once the materials are consolidated the word needs to go out to the public as to how to access them.

9. Access to Technical/Production Expertise

SURVEY COMMENTS AND SUGGESTIONS

- Aquaculture Training
- External expertise can be brought in at added costs and delay
- MAFRI is setting up a four-day workshop on aquaculture in February and March 2006. MRAC has been a major funder of aquaculture projects assessing the feasibility of aquaculture in Manitoba. So slowly but surely we are bringing the experts in to provide potential fish farmers with the information they require.
- This information will become available through suppliers and value chain relationships. Government should ensure that appropriate research is being done, however, the industry will be very pro-active.
- Without this, a new business cannot start.
- A demonstration farm would be a significant plus in establishing a comfort level for potential producers, and would also result to some extent in other support services such as vet expertise being developed and put in place
- While I think this is very important, I believe there are resources out there that we can access - it is just that they are largely out of province, and therefore would be quite costly
- Limited in MB but we have taken the first steps
- I like the theory of a model farm
- There is lots of valuable technical information out there, should try to use it.

SMALL GROUP REPORT AND DISCUSSION

The group that dealt with this issue overlapped considerably with the group that dealt with education and training. The group proposed a “Demonstration Farm” as opposed to a “Model Farm” with the following features..

- Private ownership
- More realistic
- Working farm
- Species specific
- With some financial guarantees, and
- The ability to charge fees for advice and teaching.

The group also felt that a producer organization could perform a useful role in providing technical expertise to its members, consumers and others. They suggested that it be funded to operate a website on aquaculture.

There is also a role for government to develop an information package for consumers such as a “Manitoba Fish Advantage” program, to provide information packages to producers, to develop training programs for workers, to develop a library etc..

LARGE GROUP DISCUSSION

The large group endorsed the work of the small group.

RECOMMENDATIONS

The main recommendation emerging from this issue is that responsibility for extension be part of the mandate of MAFRI and the proposed producer association. The group that dealt with education and training provided more details.

10. Access to Specialized Veterinary Services

SURVEY COMMENTS AND SUGGESTIONS

- Also specialized environmental management advice. We are the province with the most water in the world and the only province with a special department to protect the nearly unlimited resources we have.
- I am not sure that a separate Vet service is needed, if the technical and production expertise is available.
- Our provincial vet diagnostic laboratory just requires accreditation through training from the federal fish lab in Atlantic Canada. DFO in Winnipeg has some well trained staff in Fish health
- I am not sure that a separate Vet service is needed, if the technical and production expertise is available.
- Again, very important, but I think this would happen fairly quickly once the industry became large enough to justify veterinary clinics providing this expertise
- An area we will address through recruitment; access now through BC or PEI

SMALL GROUP REPORT AND DISCUSSION

The small group emphasized the importance of this infrastructure element over the long run. It is critical that we maintain a 'disease-free' status as the industry grows. Veterinary services will be an important part of that goal. We need government commitment of Vet Services in Aquaculture. The capacity of testing facilities needs to be expanded. Currently the University is the most relevant source of information.

LARGE GROUP DISCUSSION

The large group endorsed the need to a source of veterinary services in Manitoba to serve this sector as it grows. Fortunately, we had a person in the large group who works in MAFRI's Veterinary Services who informed us that MAFRI has a mandate and a fund for maintaining and developing Veterinary Services in Manitoba. He suggested that we recommend that this fund be used to develop the capacity to serve aquaculture needs. There is much precedent for this in other fields including upgrading existing staff within MAFRI until an adequate demand develops to encourage private practitioners to meet the needs. We were also advised that that a one week workshop is available in Prince Edward Island that would bring a qualified veterinarian up to speed on this sector.

RECOMMENDATIONS

The main recommendation for this issue was that MAFRI use its existing veterinary services development mandate and budget to ensure that one or more individuals gets trained and upgraded to meet the veterinary needs of this sector.

11. Training and Education

SURVEY COMMENTS AND SUGGESTIONS

- Make Courses and Training on Aquaculture available in smaller communities
- Action needs to be taken to build skills required by the sector
- Model fish farms are the only way to go. A national study" The Scope and Potential of Aquaculture As A Diversification Strategy for Traditional Agriculture Operations" done by Stechey and Gilbert in August 2004 recommended Model Fish Farms as a necessity for training and education of potential fish farmers in Manitoba. The study on the "Practical Assessment of the Potential for Aquaculture Development In Manitoba" done by Stechey in November 2005 once again stated the need for the development of Model Fish Farms in Manitoba for training and education
- Hands on demonstration/research/teaching facility
- The ultimate would be a demonstration farm of some type with the University involved
- While I think this area is very important, I also think there are existing resources we can draw on to help us. Again, though, these resources are largely out of province, and will be costly.

SMALL GROUP REPORT AND DISCUSSION

This group concluded that many of the training and education needs of the sector could be met though some form of "Model" Farm. They felt that such a venture should have the following features..

- It should be a ‘Joint venture’ with several stakeholders.
- An Independent group should be the lead (e.g. Producers Association)
- It should be tied in with one or more educational institutions
- It should have both academic and practical training
- There should be some Government involvement

As the group responded to questions, the concept was expanded to include other features such as..

- Use of an existing facility as the model.
- A ‘High-tech, state-of-the art’ facility to act as a catalyst
- The need for a demonstration farm is to allow people to touch, feel and experience. We need to make people aware before they embrace the industry.
- There could be 2 kinds of training: The business side, marketing, financing etc. and hands on production training
- The venture could have both an educational component and exist as a commercial venture. Its two missions could be kept separate for accounting purposes so that the two missions do not conflict. The whole venture may not have to make a ‘profit’ in the normal sense because of its educational mandate.
- The ‘Model’ Farm would allow the “blue prints” to be transferred to those wanting to learn and invest. It also allows for the collection of data on production analysis and improvement purposes.
- If run by the industry association it could be a source of revenue from visits and training contracts.

The group went on to report its discussions of the need for a larger **Provincial Policy Framework on Aquaculture** within which the educational component could reside. The group feels that..

- In order for any of the above to work there is a requirement for a commitment from Government and a policy framework on Aquaculture to start framing the issues.
- We need an answer to the questions “*Do we have a commitment from Government?*” and, “*Does the government take Aquaculture seriously?*”
- Government needs to decide who is the lead agency? If it is to be MAFRI, there needs to be a commitment of dollars as well. The first task would be to develop a mandate with a focus on Tank Aquaculture (although Cage Aquaculture may also be considered).
- The question raised by other groups on Business Risk management would also be part of that strategy framework.
- Government support for a training facility sends a strong message and is a component of a policy framework

LARGE GROUP DISCUSSION

In the large group, the phrase “Model Farm” generated some reactions ranging from strong support to outright rejection. However, there was clear consensus on the need for training and education of producers, workers, consumers and others.

Those in favour of the use of a specific place or facility made the case that they work in other places and other industries and that they send out a clear message to the consuming public. Those opposed are concerned about the best use of limited resources, the fact that a choice of location would mean uneven access throughout the province, and that there are other alternative educational models worth considering.

As we discussed and explored the topic additional ideas emerged that might form the basis for action. We discussed..

- Virtual models using the internet and distance education capacities
- Use multiple locations
- Co-location with other model operations
- Attachments to existing ventures
- Build a research showcase
- Look at what others have done both in other sectors and in other locations
- Try a new name such as “Demonstration and Development Farm”
- We have existing facilities that are looking for support. Why not upgrade an existing facility?
- We could add dollars to the existing farms and make each a training centre.
- Could develop a delivery model similar comparable to Assiniboine Community College’s pork sector training that is delivered in partnership with operational facilities.
- If money is the concern we might channel existing dollars from various sources to improve the situation. (e.g. aboriginal funding programs). If you locate it in rural communities you can access Human Resources Canada dollars.

On the broader question of the need to get provincial government commitment to aquaculture and to give MAFRI the lead role, the large group endorsed the conclusions of the small group.

RECOMMENDATIONS

This group came up with two fundamental recommendations that had considerable influence on the final set of recommendations found in the Executive Summary.

The first was an overriding recommendation that MAFRI become the prime agency of Government responsible for Aquaculture in Manitoba. Along with that responsibility would come the need to create a Policy Framework for Aquaculture and an accompanying administrated structure.

The second recommendation would be an outgrowth of the first. One of the responsibilities that would emerge from the policy framework would be responsibility for developing an education and training capacity in support of growth in this industry. While many delivery models were discussed, at this point there is no specific recommended approach other than that MAFRI work in partnership with producers, educational institutions and funders to find the best ways and means to meet the educational and training needs of the sector.

12. Genetic development

SURVEY COMMENTS AND SUGGESTIONS

- ❑ The rainbow trout genetic base seems to be wide and varied. Therefore there seems to be no concerns with the rainbow trout. But there are big concerns about Arctic Char, which have a narrow genetic base and this results in a lack of growth and a lack of uniformity. We need to introduce new genetics to the current arctic char genetic base
- ❑ Creates new opportunities.
- ❑ In place in some species, and a long slow process in other species. No high on the list of immediately important factors.
- ❑ For some fish types, I understand that the genetics are very well developed. However, it is important to continue to work on this area, as a lack of attention to genetic development will eventually result in stagnation
- ❑ The expertise is available to steer us in the right direction as to what species to raise
- ❑ Particularly important for Arctic Char

SMALL GROUP REPORT AND DISCUSSION

The small group looked at each of the major species and felt that, at this point in time, there are no high-priority genetics issues to be dealt with. Time and resources would be best spent on other infrastructure matters. The large group endorsed that conclusion.

RECOMMENDATIONS AND CONCLUSIONS

The main conclusion concerning this issue was that it was not a significant problem at this point. It may become more important as the industry grows and develops.

4. TAKING THE NEXT STEPS

The following short-term action plan was agreed upon as a basis for moving forward over the next few weeks and months.

ACTION STEPS	WHO	TIMING
1. A report on the outcomes of this conference will be provided in draft form by the facilitator.	facilitator	November
2. Draft report will be reviewed by MRAC and MAFRI and revised as required.	MRAC and MAFRI	November/December
3. A final version of the report with appropriate appendices will be produced and distributed to participants.	MRAC and MAFRI	December
4. MRAC and MAFRI to produce a responsibility table and a timetable for the implementation of the key recommendations coming from the conference along with a monitoring and reporting process.	MRAC and MAFRI	Beginning in December
5. The Manitoba Government will be asked to formally endorse recommendations from this conference and provide a timeframe within which it will act on those recommendations that specifically apply to MAFRI.	Minister of Agriculture, Food and Rural Initiatives	Beginning in December

APPENDIX 1: AGENDA

AGENDA

8:30 a.m. Registration

9:00 a.m. Opening Remarks, Linda MacNair, MRAC Director

9:15 a.m. Setting the stage

- Les Routledge, Prairie Practitioners Group
- Dr. Terry Dick, Department of Zoology, U of M
- John Bottomley, Manitoba producer

10:15 a.m. Survey results

A review of pre-conference questionnaire results will help channel further discussion.

10:30 a.m. Break

10:45 a.m. Infrastructure issues

Breakout groups discussions

12:00 p.m. Lunch

1:00 p.m. Reports and Discussions

Breakout groups will report on discussions and recommendations.

2:30 p.m. Break

2:45 p.m. Decisions and recommendations

3:15 p.m. Action plan and Implementation

4:00 p.m. Wrap up

APPENDIX 2: PARTICIPANTS

Spawning Aquaculture Workshop Attendees

23-Nov-05

Name	Organization
Bruce Collins	MB Agricultural Services Corp.
Colleen Domino	MB Agricultural Services Corp.
Maurice Bouvier	MAFRI
Brent McCannell	MAFRI
Allan Preston	MAFRI
Bill Steeds	MAFRI
Terry Whiting	MAFRI
Carolynn Osborn	MAFRI
Terry Dick	University of Manitoba
Hilmar Johnson	MAFRI
Rex Newkirk	Cdn International Grains Institute
Gerry Malone	Freshwater Fish Marketing Corporation
Dennis Geisler	Freshwater Fish Marketing Corporation
Jim Gibson	Dept. of Fisheries and Oceans
Dennis Wright	Dept. of Fisheries and Oceans
Peter Arntfield	Cdn Food Inspection Agency
Bruce Hauser	Cdn Food Inspection Agency
Barb Scaife	MB Water Stewardship
Graham Phipps	MB Water Stewardship
Bruce Webb	MB Conservation

Daniel Stechey	Cdn Aquaculture Systems Inc.
Ted Eastley	Assiniboine Community College
John Bottomly	Agassiz Aqua Farm
Melvin Phillips	Phillips Aquatics
Susan Proven	MRAC
Les Routledge	Prairie Practitioners Group
Carl Cunningham	Prairie Practitioners Group
Brian Kelly	Kelwin Management Consulting
Deny St.George	Manitoba Hydro
Peggy Barker	Consumers Assoc. of Canada(Manitoba)
Bob Bedggood	Agricultural Adaptation Council
Neil Van Ryssel	MRAC
Esther Fyk	MRAC
Glen Jeffrey	MRAC
Linda MacNair	MRAC
Kristin Yaworski-Lowdon	MRAC
David Elias	MRAC
Al Holmes	Facilitator
Rick Verspeek	Turtle Mountain Sustainable Ventures