Strategic Review of the Aquaculture Collaborative Research and Development Program

Final Report

Prepared for: Fisheries and Oceans Canada

Prepared by:
Goss Gilroy Inc.
Management Consultants
Suite 900, 150 Metcalfe Street
Ottawa, ON K2P 1P1
Tel: (613) 230-5577
Fax: (613) 235-9592
E-mail: ggi@ggi.ca

March 31, 2005

Table of Contents

Executive Summary

Purpose and Context

This report presents the findings of a Strategic Review of the Aquaculture Collaborative Research and Development Program (ACRDP). ACRDP is a Fisheries and Oceans Canada (DFO) initiative to increase the level of collaborative research and development activity between the aquaculture industry and the department, and in some instances with other funding partners. The three broad research and development topic areas included in ACRDP are: 1) Best performance in fish

production; 2) Optimal fish health; and 3) Industry environmental performance. Approximately $4.5 million is allocated to ACRDP per year.

Collaborative arrangements consist of a formal agreement between the DFO and the industry partner, and in some instances other partners. Industry is required to contribute a cash contribution to the project. The industry contribution is based on the ACRDP contribution. The minimum industry contribution target was to be 25% in 2003/04.

Methodology of Review

The Strategic Review assessed the program's relevance, success, design, and cost-effectiveness. The methods used for the Review include:

- A document review of the ACRDP and its projects, and a literature review of the aquaculture industry in Canada;
- Key informant interviews with DFO program managers, experts, and industry stakeholders to assess the program relevance to industry (n=10);
- An in-depth review of a sample of 16 ACRDP projects and follow-up interviews with industry partners (n=16); and,
- Workshops with industry, provincial and federal government representatives (Nanaimo [BC], Burlington [ON], Mont-Joli [Qc], Moncton [NB] and St. John's [NL]).

Findings

Rationale and Relevance

According to the evidence gathered for the Review, the ACRDP is a relevant and needed program for the Canadian aquaculture industry. Based on domestic and worldwide demand for fish products, the industry has significant potential for growth, provided that certain barriers can be overcome. The industry requires assistance in overcoming a number of challenges that are beyond its ability to address effectively, including technical barriers and challenges related to the environment. There are also communication challenges as there is a negative perception of aquaculture among certain influential NGOs.

In bringing a rigorous scientific approach to the issue of environmental impacts associated with aquaculture, ACRDP has the opportunity to clarify some of the misinformation that persists. The industry includes small firms that are marginally profitable and do not have the financial means to invest in research and development that could improve its competitiveness. Projects funded by ACRDP and conducted jointly between industry and DFO scientists are helping to provide answers to issues of optimal fish health, developing new and better species, and best performance practices. The ACRDP therefore has a role to play in the improvement of the industry's competitiveness and the transfer of knowledge from scientists to industry operators.

Design and Delivery

The Strategic Review concluded that program publicity has been adequate and awareness of the ACRDP is quite high across the country. To date, there have been more proposals than funds available, which would indicate a good flow of proposals. The Strategic Review found that the application process for ACRDP is satisfactory and that the regional management committee process has, for the most part, been effective in selecting the best projects. As a result, ACRDP has been able to generate high quality projects.

The Strategic Review also found that industry project participants were particularly impressed with the quality of the DFO scientists. A review of ACRDP projects revealed that a good cross section of research is occurring and that most ACRDP participants are generally pleased with the

application process. According to findings, however, some research being conducted may be too academic and not responsive to the immediate needs of industry.

The Strategic Review concluded that dissemination of research results is appropriate, and in cases where industry has made a significant financial contribution to the project, adequate intellectual protection is provided to industry. For many projects, research results are formalized in the form of a report that is made available to industry. National and regional workshops are also a common mechanism for bringing people together to discuss research results. In the case of some projects, dissemination can occur through technical and non-technical factsheets that are placed on the DFO website.

Although the delivery of the program is satisfactory overall, the evidence gathered for the Review indicates that many firms lack the financial resources needed to conduct development activities that would allow them to use the research results to make their operations more competitive. Some indicated that their participation to future ACRDP projects would be difficult considering their financial situation and the requirement to provide financial contributions to projects.

Results / Success

According to interviews and case study findings, many ACRDP projects have generated tangible benefits to the industry or have the potential to provide benefits in the near future. The quality of scientific work performed by DFO scientists met the industry's expectations. Several projects have since led to further collaboration.

The Strategic Review concluded that some ACRDP projects, particularly those in the area of environmental impacts have already or will soon positively impact the competitiveness of the industry. These projects have for instance provided answers regarding disease transmission, and the nature and magnitude of effects that aquaculture has on its nearby environment. Other projects have for example helped the industry find solutions to reduce phosphorus waste. These and other research results have or will likely shape regulatory policies, which are expected to impact the number and location of aquaculture operations, and ultimately impact the volume of production, operating costs, and profitability of the industry.

Cost Effectiveness

The Strategic Review concluded that there are design and delivery issues that have affected the efficiency and effectiveness of ACRDP. There is a risk that firms may not be able to fully benefit from projects that conducted research in the area of species diversification. If the funding is not made available for development activities, the cost effectiveness of these projects is undermined (as a result of lack of benefits).

The Strategic Review concluded that the hiring policies and practices of the ACRDP impede the program's effectiveness. Many industry representatives complained that the hiring process is slow and causes delays to projects. The DFO term employee rates paid to these employees are perceived as being relatively high.

Recommendations

Considering the above findings, the following recommendations are proposed.

1. According to TBS directions, a DFO researcher must be responsible for the execution of each project. Those researchers have the capacity to engage in collaborative agreements and contracts with other organizations and individuals. When cost-effective, these types of arrangements should be encouraged to compensate for areas of expertise as yet to be developed in DFO.

2. It is recommended that the definition of eligible industry partners be broadened to include industry service organizations such as feed companies.

3. While many industry partners are well established and go to ACRDP to increase their performance, a number are only entering the market and have few resources. Where commercialization is anticipated as a potential outcome from an ACRDP project, proponents should engage economic development expertise early in the development of the project (e.g. WD, FedNor, DEC, ACOA).

4. In the consultant's view, if DFO is to help develop a sustainable industry, it should ensure that the program is accessible both to established and emerging organizations. In recognition of industry participants with limited resources, the program should develop greater flexibility in regards to industry contribution to ACRDP projects (mix of cash and in-kind contributions, as well as level of contribution). For smaller or emerging organizations, a 10% contribution (cash or in-kind) should suffice. This will ensure greater attribution. Leveraging from other sources should be further encouraged.

5. Concerns were expressed in the workshops about redirection of ACRDP funds to projects that have no industry participant. An effort should be made to ensure that no research funds from ACRDP are expended without an industry participant in the project.

6. Greater flexibility is needed to meet changing regional demands for research. It is recommended that ACRDP develop an approach to regional funding which permits a portion of funds presently notionally allocated to the regions to be available for re-allocation. This re-allocation will allow ACRDP to adapt to changing demands for services.

7. Despite the significant economic potential for the aquaculture industry, including in major economic-distressed areas, evidence from the review shows that a number of stakeholders object or are opposed to aquaculture for various reasons. These include NGOs, some portion of the general public, and some government representatives. ACRDP needs to review its communication strategy to support the development of sustainable aquaculture in Canada. In addition, an ACRDP communications strategy should ensure that findings and expertise within ACRDP is known by and available to the people and organizations that supply farm extension services.

8. ACRDP could also better promote the benefits of aquaculture to other DFO sectors. It is recommended a communications strategy be developed to communicate ACRDP and the industry's activities and benefits within DFO.

9. The results of this review show that senior DFO researchers will soon retire and leave a gap in DFO aquaculture research capacity. DFO needs to recognize this issue and ensure that a strategy is implemented to replace expertise lost through retirement.

1.0 Introduction

This report presents the findings of a Strategic Review of the Aquaculture Collaborative Research and Development Program (ACRDP). ACRDP is a Fisheries and Oceans Canada (DFO) initiative to increase the level of collaborative research and development activity between the aquaculture industry and the department, and in some instances with other funding partners.

1.1 ACRDP Program Profile

On behalf of the Government of Canada, DFO is responsible for developing and implementing policies and programs in support of Canada's scientific, ecological, social and economic interests in oceans and fresh waters.

DFO is a national and international leader in marine safety and in the management of oceans and freshwater resources. Departmental activities and presence on Canadian waters help to ensure the safe movement of people and goods. As a sustainable development department, DFO will integrate environment, economic and social perspectives to ensure Canada's oceans and freshwater resources benefit this generation and those to come.

The Department's guiding legislation includes the Oceans Act, which charges the Minister with leading oceans management and providing coast guard and hydrographic services on behalf of the Government of Canada, and the Fisheries Act, which confers responsibility to the Minister for the management of fisheries, habitat and aquaculture. The Department is also one of the three responsible authorities under the Species at Risk Act.

ACRDP

The Aquaculture Collaborative Research and Development Program (ACRDP) is a DFO initiative to improve the competitiveness of the Canadian aquaculture industry by increasing the level of collaborative research and development activity between the aquaculture industry and the department, and other key partners. ACRDP is an industry-driven program that teams industry with DFO researchers to undertake research activities that lie within the mandate of DFO based on the priorities and needs of the aquaculture industry.

Consistent with the Federal Aquaculture Development Strategy (FADS) approved in 1995, and in response to needs expressed by the aquaculture industry, DFO initiated a collaborative research and development program modeled on the Matching Investment Initiative (MII) approach at Agriculture and Agri-Food Canada.

The ACRDP provides funds for research and development projects that are proposed and jointly funded by private sector partners. The program began in 2000 and was to be phased in to provide for private sector take up, with a 50% industry contribution target to be reached within five years as industry capacity is developed. In the early years of the program, DFO's contribution was to be higher than industry's. Research priorities for the ACRDP are based on industry needs and lie within the mandate of DFO.

The key objective of the ACRDP is "to improve the competitiveness of the Canadian aquaculture industry by increasing the level of collaborative research and development activity between the Canadian aquaculture industry, DFO and other key partners (TBS direction FO 15-00)."

Additional sub-objectives for the program (ACRDP web site as of 10/19/2004) are to:

- Increase collaboration between the department and industry on scientific research and development that will enhance aquaculture in Canada;
- Facilitate and accelerate the process of technology transfer and research commercialization through closer collaboration with the Canadian aquaculture industry; and
- Increase scientific capacity for essential aquaculture research and development in the aquaculture sector.

The three broad research and development topic areas included in ACRDP are:

1. Best performance in fish production;
2. Optimal fish health; and
3. Industry environmental performance.

Projects are conducted at DFO research facilities or industry partner facilities. The program allocates funds to collaborative research projects that are proposed and jointly funded by aquaculture producer partners. Approximately $4.5 million per year is allocated to the regions for ACRDP.

The ACRDP is administered by the DFO Science sector. A National Steering Committee (co-chaired by the DFO Science and Fisheries and Aquaculture Management sectors) was established. It includes representatives from DFO Science, Oceans and Habitat, Fisheries and Aquaculture Management, industry, and provinces. The purpose of the National Steering Committee is to:

- Provide direction on the zonal priority setting process;
- Establish the priority areas and criteria upon which industry submissions are evaluated by the DFO research centres;

- Allocate notional budgets to the DFO research centres based on established priority areas;
- Regularly review notional allocations and spending of DFO research centres and determine if re-allocations are required;
- Monitor final project approvals and commitment of funds by the DFO research centres against established criteria; and,
- Evaluate the program, report on its performance, and make recommendations on its management for continuous improvement.

1.1.1 The Application Process

Eligible industry applicants include aquaculture producers operating within Canada who are directly involved in producing an aquatic species for pre-commercial or commercial purposes; producers undertaking commercial or developmental production activities on new or existing aquaculture species; aquaculture companies or associations involved with sea ranching mariculture operations; industry producer associations or consortia of producers; and other aquaculture sector stakeholders participating as a partner with an industry producer. Aquaculture production is defined as growing an aquatic species and further, that the aquaculture producer has ownership of the product or has an aquaculture license or lease to culture the product.

DFO officials review proposals to ensure completeness, accuracy and eligibility under ACRDP criteria. All eligible projects undergo a two part peer-review: first, a technical review by internal DFO and (or) when appropriate, external scientists, followed by a comprehensive review by a Regional ACRDP Committee, comprised of representatives from DFO, provinces, industry and others. The Committee makes recommendations to the Regional Directors of Science, who have the authority to approve project expeditures.

At the start of the program there were three deadline dates for project proposal submission. In 2004 this was reduced to two deadlines one in January and one in April. Regional ACRDP Committees review and evaluate proposals in a timely manner and final notification of the project assessment is provided no later than 60 days after the deadline dates.

1.1.2 Project Collaboration and Cost Sharing

Collaborative arrangements consist of a formal agreement between the DFO and the industry partner, and in some instances other partners. A schedule to the agreement contains a detailed description of the Project (activities, deliverables, timeframes to be carried out by DFO and the industry partner under the agreement or by a third party under contract agreement with DFO), with estimated amounts to be expended on each activity. The agreement sets out the method and schedule of payment to DFO and reporting requirements. If appropriate, an Intellectual Property agreement is negotiated.

A formula is negotiated for each project, taking into account in-cash and in-kind contributions of both parties to the agreement. Industry cash contributions to a project are managed through a DFO Specified Purpose Account (SPA). The industry contribution is based on the ACRDP contribution. The minimum industry contribution target was to be 25% in 2003/04. There was a recent decision by the ACRDP National Steering Committee to make a special case for the 2004-05 fiscal year in which it will permit a 7.5% cash contribution as long as the total industry contribution (in cash and in kind) achieves the 30% objective.

Eligible expenses covered by ACRDP include:

- Wages and salaries plus associated required payroll benefits of project personnel (scientific and technical) or post-doctoral or graduate student support;
- Laboratory and field supplies;
- Travel costs directly related to the goals of the project; and,
- Other expenses agreed to be necessary to the success of the project.

Industry and DFO partners are required to provide progress reports at 6 months, annually, and a final report.

2.0 Strategic Review Approach

2.1 Scope and Objectives of the Strategic Review

The Strategic Review of the ACRDP covered the period from 2000-01 to 2003-04. The objectives of the assignment were to:

- Examine the ongoing relevance of the ACRDP to industry, DFO's mandate, and the government;
- Determine the degree of success of the Program in meeting its objectives;
- Assess the cost-effectiveness as well as the timeliness of results achieved;
- Produce a logic model for the ACRDP and identify parameters to measure performance in relation to the logic model then survey industry and government to determine the performance of the program in relation to those parameters; and,
- Provide recommendations based on the analysis of the above findings.

2.2 The Approach

The approach for this Strategic Review was designed to address the above mentioned Strategic Review objectives and issues. The Strategic Review examined the program's relevance, success, design and cost-effectiveness. The main approaches that were followed in conducting this Strategic Review include:

- A brief document review of the ACRDP and its projects, and an overview of the aquaculture industry in Canada;
- Key informant interviews with DFO program managers, experts, and industry stakeholders to assess the program relevance to industry;
- An in-depth review of a sample of 16 ACRDP projects and follow-up interviews with industry partners; and,
- Workshops with industry, provincial and federal government representatives.

Document / Literature Review
DFO Science Sector provided relevant website information, and literature related to the industry situation. This information was reviewed to address issues related to: Industry situation – competition, supply demand trends, new product trends, Canadian industry strengths and weaknesses.

The DFO Science Sector provided a list of all current projects as well as other pertinent documentation on the projects supported by ACRDP. This information is also available on the DFO website. Documentation (proposals and website synopses) for all projects initiated in the last 3 years (approximately 70) were briefly reviewed and summarized to provide an overview of project areas and expected results. This provided an overview of the results achieved at the project level.

Key Informant Interviews
Because of the complex nature of the projects from a science point of view, key informant interviews with stakeholders and partners were a critical part of the Strategic Review. Key informants included: DFO project managers (researchers), project staff, industry representatives and stakeholders. GGI conducted the interviews with key informants in two phases:

- Interviews conducted with key DFO staff, industry representatives and/or associations (n=10). These interviews provided in-depth information that allowed the Strategic Review team to describe in detail the rationale, objectives achievement, cost-effectiveness, alternatives, management and accountability, and examples of possible results (outputs, and outcomes) of projects. Key informant interviews were also essential in identifying and

understanding unforeseen obstacles and lessons learned that are usually difficult to measure using quantitative methodologies.
- Project specific key informant interviews (n=16) were conducted with selected aquaculture industry representatives that are involved or familiar with the projects to ascertain the relevance of the projects to the industry, their success to date, and potential impacts on the industry in the future.

Review of 16 ACRDP Projects
A sample of 16 projects was selected to provide information on the 102 projects underway as of September 2004. The sample was allocated by region and further allocated by the three key topic areas: production, health and environment. In addition, an attempt was made to ensure coverage of both shellfish and finfish projects.

Industry-Government Workshops
GGI conducted 1-day workshops at 5 sites (Nanaimo [BC], Burlington [ON], Mont-Joli [Qc], Moncton [NB] and St. John's [NL]) with aquaculture industry and government representatives. A SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis was conducted during the workshops. The workshops provided representatives from industry and government with an opportunity to discuss the internal strengths and weaknesses of the ACRDP, its opportunities, and its threats, and identify how the present structure and operational procedures enable or impede achievement of program objectives. A national wrap-up workshop was subsequently held in Ottawa in January 2005.

3.0 Strategic Review Findings

3.1 Rationale / Relevance

Issue 1: Are the mandate and objectives of the Program still relevant to the aquaculture industry? Is the Program meeting the needs of the Canadian aquaculture industry?

Finding: Based on a document review, key informant interviews, interviews with aquaculture operators involved with ACRDP projects, and workshops conducted across Canada, the Strategic Review found that the mandate and objectives of ACRDP are still relevant to the aquaculture industry. Although the program is generating important scientific knowledge, it is not meeting a crucial industry need, namely the provision of funding for development that would bridge the gap between research and commercialization.

According to DFO documents, the key objective of the ACRDP is to improve the competitiveness of the Canadian aquaculture industry. In addition, the program is intended to:

- Increase collaboration between the department and industry on scientific research and development that will enhance aquaculture in Canada;
- Facilitate and accelerate the process of technology transfer and research commercialization through closer collaboration with the Canadian aquaculture industry; and
- Increase scientific capacity for essential aquaculture research and development in the aquaculture sector.

The three broad research and development topic areas included in ACRDP are best performance in fish production; optimal fish health; and industry environmental performance.

The Strategic Review found that aquaculture is a growth industry. From 1992 to 2001, the world live weight of fish supplied from aquaculture grew nearly 2.5 times. In contrast, wild catches rose only 7.6 percent (NOAA, 2003 p. 47). In short, over three quarters of the increased supply of all fish measured by weight 1992 to 2001 emanated from aquaculture. The industry is therefore vital to satisfying the world's demand for fish and other marine foods. Despite strong worldwide demand for aquaculture products, the Canadian aquaculture industry is not particularly healthy. The industry consists of many small firms that are marginally profitable and do not have the

financial means to invest in the improvement of species, the development of new species, or alternative growing methods. The ACRDP program therefore is making an investment in the improvement of the industry's competitiveness by providing much needed research money and scientific expertise.

The Strategic Review found that the ACRDP objectives and R&D topic areas are relevant to the aquaculture industry in Canada. Many projects undertaken by the ACRDP are intended to improve the knowledge of fish health, disease, and optimal broodstocks. This knowledge could eventually be used by operators to reduce losses, improve broodstocks and lower operating costs. Some operators involved in ACRDP projects, however, were of the opinion that some of the research being conducted is too academic. Although the initial proposals addressed relevant issues, the research approach was not solution-oriented.

The aquaculture industry in Canada currently operates in a fairly restrictive regulatory environment, and will likely continue to do so until the environmental changes associated with aquaculture are better understood by stakeholders. Many ACRDP projects generate scientific knowledge regarding potential environmental effects of escapees, the effects of waste from cages, and the potential transmission of disease. Research is also supplying information on alternate technical developments and operational practices that will mitigate these effects. This information helps regulators develop appropriate policies and regulatory tools for the operation of the industry. If ACRDP research for instance, demonstrates that aquaculture's impacts on the environment are less than currently perceived, there is the potential for industry to grow accordingly.

3.2 Design and Delivery

Issue 2: Are the projects driven by industry demand or by DFO "supply"? Are the projects truly industry driven? Are the projects a high priority for industry?

Finding: The Strategic Review concluded that projects are a high priority for the industry. Most projects are either initiated by the industry or collaboratively by the industry and the government. However, in some regions, DFO's support to the program and the projects has been limited.

The Strategic Review found that most projects were initiated by the industry, either by operators or their industry associations. Examples of high priority issues addressed by projects that were initiated by the industry include:

- Evaluating the effects of escaped farmed salmon;
- Potential for disease transmission; and,
- Environmental effects of using non-permanent gear for oyster culture.

In a few projects, DFO was a co-initiator of the project with industry. These projects involved for example,

- Determining the correct timing of egg stripping; and
- Determining the effect of temperature, time of spawning and egg quality, and tank size on sablefish.

Every project, however, whether it was DFO that approached industry, or vice versa, addressed a problem that was of importance to the aquaculture industry, and was considered a high priority.

However, in some regions, industry representatives feel that DFO representatives have limited interest in ACRDP and aquaculture in general. In one region, DFO appears to be more interested in supporting fishery operations/research than to encourage aquaculture. In another region, interest in research in freshwater species at the researcher level is perceived by industry to be limited. For industry, this comes as a surprise considering the volume of freshwater aquaculture production overall. Industry representatives also perceive that some researchers are more interested in basic research than applied research .

Issue 3: Is there adequate program publicity in order to generate high quality projects?

Finding: The Strategic Review concluded that program publicity has been adequate to generate high quality projects.

Key informant interviews revealed that awareness of the ACRDP is quite high across the country. The high level of awareness results from several factors. The Canadian aquaculture industry is a fairly small community of operators and associations who communicate with one another frequently. A number of presentations regarding ACRDP have been made at regional and national meetings attended by key industry players. Finally, DFO has provided a website for ACRDP which is used extensively by the industry. The Strategic Review found that representatives from firms that participated in ACRDP projects are of the opinion that the projects are generally of high quality.

Issue 4: Is the application process for ACRDP funding fair, competitive, timely and responsive? How effective has the regional management committee process been in selecting the best projects?

Finding: The Strategic Review found that the application process for ACRDP is satisfactory and that the regional management committee process has been effective in selecting the best projects.

A review of projects documents, and interviews conducted with key informants from government, industry associations, and industry representatives participating in ACRDP projects revealed that a good cross section of research is occurring and that most ACRDP participants are generally pleased with the application process.

To date, there have been more proposals than funds available, which would indicate a good flow of proposals. In many cases, due to the complex scientific nature of the proposed projects, a DFO scientist took care of the task of writing the proposal rather than an industry representative. Proposals are first vetted through peer review, and then by the regional committees. The regional management committee process involves representatives from DFO, the provinces and industry coming together to identify priorities, and hold meetings and conference calls to discuss proposals and issues. While there is a common national approach, regional committees implement the program reflecting the regional administrative context and priorities. Finally, the regional director of science approves funding for recommended proposals. Most key informants were satisfied with the regional committee process.

Issue 5: Has DFO established appropriate ways to disseminate information on the research being carried out? Are the research results being given adequate Intellectual Property protection to ensure that the benefits are retained by Canadian industry?

Finding: The Strategic Review concluded that dissemination of research results is appropriate, and in cases where industry has made a significant financial contribution to the project, adequate intellectual protection is provided to industry.

There are a variety of methods in which research information is disseminated. For many projects, research results are formalized in the form of a report that is made available to industry. National and regional workshops are also a common mechanism for bringing people together to discuss research results. In the case of some projects, dissemination can occur through technical and non-technical fact-sheets that are placed on the DFO website.

The nature of the research determines whether results are immediately available to the public or kept private for a number of years. Results can be made confidential for up to 2 years if industry provides a major contribution towards the research. In the absence of a significant industry contribution, results are made public at the completion of the project.

As many projects have not been completed, dissemination of results has only been carried out in a limited number of projects.

Issue 6: Has industry established appropriate ways to ensure uptake of the research? Does industry have the capacity to adequately utilize the research results in terms of investment in processes, capital equipment etc.? Are all of the necessary ingredients in place to ensure that industry capitalizes on the ACRDP funded research? What are the barriers to downstream implementation?

Finding: The Strategic Review concluded that in some cases, firms face significant challenges in capitalizing on the research flowing from ACRDP projects. Many firms lack the financial resources needed to participate further in ACRDP, or conduct development activities that would allow them to use the research results to make their operations more competitive.

Workshops and interviews held with representatives from the aquaculture industry revealed that in many instances, the industry does not have the capacity to fully utilize and benefit from the research conducted under ACRDP. The problem is that to capitalize, some ACRDP research requires a significant investment in development and pilot testing. Findings of this study indicate that firms in most regions have limited financing capacity. Thus companies, especially those involved in species diversification, face serious financial obstacles to further participate in ACRDP, or make the sort of investments in development that would allow them to exploit the research results. Industry has stated that there is therefore a need for assistance for commercialization.

In many cases, the lack of development capital is aggravated by the difficulty in obtaining bank financing for operations, the long lead-time to realize a harvestable product (especially for some species of shellfish), and the long regulatory and licensing lead times required.

3.3 Results/Success

Issue 7: What are likely to be the results and outcomes of the research products? Are they useful? Are the project results likely to be commercialized? How do projects actually end up being exploited or commercialized? How will they support the industry?

Finding: The Strategic Review concluded that most projects are providing useful results. With very limited funding for development, however, projects conducting research on new or improved species are constrained from reaching the commercialization stage.

Based on a review of 16 projects and telephone interviews conducted with industry participants and DFO scientists, the Strategic Review concluded that most projects have already generated real benefits to the industry or have the potential to provide benefits in the near future. Industry participants were very impressed by the quality of scientific work performed by DFO scientists; enjoyed good working relationships; and several projects have since led to further collaboration.

Projects were conducted in three general research areas: best performance in fish production; optimal fish health; and industry environmental performance. Some projects were a combination of research areas as well. In the tables below, the results to date, benefits to the industry, and barriers (if any) to realizing benefits have been summarized for the ACRDP projects reviewed during the Strategic Review.

Projects in Best Performance in Fish Production

Five projects carried out in the area of best performance in fish production were reviewed. The projects produced valuable information on optimal breeding and best practices with respect to feeding and water temperature control. Common to these projects was the need for funding for

developmental activities and scaling up in order to fully take advantage of the information flowing from the research.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
C&A	Walleye aquaculture: A biological strategy to facilitate land-based culture of Stizostedion vitreum in recirculation systems	Project is complete, except for the write-up. The research looked at what makes a good walleye in terms of growth characteristics and breeding. The fish that have been bred to date have immune systems that are much stronger than that of wild stock. The research has the potential to improve profitability, production volume, and fish health, reduce losses, and introduce new species.	Barrier is financing for development. Without it, the research results cannot become a commercially viable product.
M&G	Maritime regional efforts to accelerate halibut commercialization: focus on broodstock expansion and egg quality	Project is expected to be completed March 31, 2005. The research intended to determine the genetic map on the fish so that they could use it to create an elite broodstock. The potential benefit for the industry is faster growing fish and lower production costs.	Funding required to do development that would ultimately lead to commercialization.
NL	Cod aquaculture – Strategies for improved hatchery broodstock management	Objective was to improve hatching survival rate of cod. This was achieved through variety of techniques, including better feeding, better water control. Survival rate went from 65% to 95%. Fish can also now spawn all year round. This will increase production considerably.	Need additional funding support to go from small scale production to large scale.
PAC	Sablefish broodstock development	Project was completed in 2003. The research provided valuable information on where to get reproductive stock, and what temperature range to keep fish at. The information has had a positive financial impact on the firm involved. It has allowed the operator to avoid mistakes, improve survival rates, and reduce costs. There is the potential benefit of new species introduction as well.	More ongoing research and development will be required to fully benefit from the work to date.
PAC	Developing optimal grow-out culture systems and diets for green sea urchin juveniles	Project expected to be completed in 2007. Project came about because of fishers complaint as to the low productivity of red and green sea urchins with respect to growth and production of roe. Potential benefits to operators include a commercially viable species on the west coast, improvement in profitability $0.10	Too early to tell.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
		per pound for every 1% increase in yield of roe, faster growth cycles, and better cash flow.	

Optimal Fish Health

Two projects in the field of optimal fish health were reviewed. Both identified treatment methods that operators could employ to mitigate the effects of predators, competitors, and infectious parasites. One of the projects will require financing to fully benefit from the research.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
M&G	Predator and competitor interaction with bivalve culture: development of an effective management approach	This study focused on mussel competitor (tunicate) and their impact on mussels. The goal was to document the competition level and feeding levels of the two. Results showed that tunicates remove a lot of food from the water. Results showed that reproductive period of tunicates is fairly long (June – Oct). Study showed that the best time to treat is after August, and possible treatment methods include lime, vinegar, and heat.	Financing is required to build a re-circulation facility to conduct development. About $250K-$300K is needed.
PAC	Reducing the impact of Kudoa thyrsites in farmed Atlantic salmon in British Columbia	Project is complete. The study attempted to identify the intermediate host of Kudoa thrysites that infect Atlantic salmon farmed in BC. The study identified practices that increase the risk of infection such as using old pens; and identified practices that could reduce the risk of infection such as longer fallow periods and identified methods that could identify infection to prevent infected meat from getting to market. The results are expected to positively impact salmon prices, operator production levels, profitability, and meat quality.	None.

Industry Environmental Performance

Four projects in the area of industry environmental performance were reviewed. These projects provided information on the environmental impacts of aquaculture that could lead to a simpler regulatory system, more aquaculture sites, and lower costs in certain cases. There were no barriers to realizing the benefits of research.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
C&A	Ecosystem experiment to assess	Project will be completed March 31, 2005, but follow on work expected for another four years. The research objective was to monitor all the	None.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
	environmental impacts of freshwater cage aquaculture	impacts of cage aquaculture – waste, wild stocks, attraction of other fish toward cage from feedings. Results show very little effect on water and fish quality. The potential benefits to industry include a simpler regulatory system, more permits issued, and higher production volume and profitability.	
M&G	The environmental impact of using non-permanent gear for oyster culture	Project is complete. Research investigated whether CEAA monitoring equipment was required for mobile equipment used in oyster culture. CEAA has since waived its requirement, saving operators $15 -$20K of costs per year.	None.
M&G	Fish Health Guidelines, Grand Manan	Project is completed. Research results are vital in determining where farm sites can be located. Potential benefits to industry include more sites and higher production volumes, better fish health management, and improved ability to meet regulatory and environmental requirements.	None
QC	Evaluation of effects of low-phosphorus diets on immune system function	Objective was to reduce phosphorus from droppings and uneaten food for freshwater production. Purpose was to test various commercial food types, to analyse phosphorous contents. One product from abroad was much lower. Impact was that it encouraged Canadian meal producers to produce similar low-phosphorus food meal. Eventually, it is likely to encourage provincial governments to stop ban of new aquaculture sites.	None.

Best Performance in Fish Production / Industry Environmental Performance

Two projects were reviewed whose research spanned both best performance in fish production and the environmental impacts of aquaculture. The research information is already being used in selecting the best aquaculture sites; in conducting risk assessments and environmental screening; and in public consultations and stakeholder discussions. There are no barriers to realizing the benefits of the research.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
PAC	Circulation and oceanography of the Broughton Archipeligo	Project to be completed March 31, 2005. The research objective was to create a computer model of water circulation to assist in long term site location planning that would help avoid damaging algae blooms that suffocate fish and avoid damage caused by deep, cold water which occurs in late summer. Model also can predict movement of sea lice from the site. Potential benefits include higher production	None.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
		volumes, improved profitability, improved fish health and survival rates, new species introduction, and improved ability to meet environmental regulations. Information is already being incorporated into long-term site selection.	
PAC	Genetic variation at microsatellite DNA loci in cultured chinook salmon strains of British Columbia	The project is completed. This project compared DNA from farmed and wild salmon to determine the risks of escaped salmon. The information is useful during CEAA screening and in managing relationships with environmental groups. Potential benefits include higher production volume, better profitability, and improved ability to meet environmental regulations. Research information has been used in risk assessments and environmental screening for siting farms; and in public consultations and stakeholder discussions.	None.

Optimal Fish Health / Industry Environmental Performance

Three projects were reviewed that conducted research that spanned the topics of optimal fish health and industry environmental performance. Potential benefits of the projects' research include a farm that will be allowed to move its stock to other sites; greater development of aquaculture; and a more environmentally-friendly feed without impacts on fish production.

Region	Project Title	Results to Date	Barriers to realizing benefits from research
M&G	Parasites affecting Atlantic aquaculture development	Expected completion date is March 31 2005. A mussel parasite problem at a particular farm was investigated to determine what was causing the problem and had the parasites spread to other farms in the area. Based on results to date, it would appear that the farm will be allowed to move its stock elsewhere. Potential benefits have included reduced fish losses, improved fish health, and improved ability to meet environmental regulations.	None
PAC	Marine finfish and suspended shellfish aquaculture: Water quality interactions and the potential for polyculture in coastal British Columbia	Project was completed in 2003. The project examined the environmental affects of salmon aquaculture on shellfish aquaculture. There was an information gap that had to be filled if co-located aquaculture was to be permitted. Could lead to higher productivity of aquaculture sites and development of aquaculture farming.	Need to see the removal of regulatory restrictions that are still in place.
QC	Phase feeding using phosphorus deficient	Project not yet completed. Delays due to peer review. Will potentially allow use of low-	Project not complete

	and replete diets to reduce total P output	phosphorous foods for lower environmental impacts, without production losses	

Issue 8: Has the Program achieved what was expected? To what extent is the ACRDP achieving its intended objective of improving competitiveness?

Finding: Some ACRDP projects, particularly those in the area of environmental impacts have already or will soon positively impact the competitiveness of the industry. In the case of projects that focused on best performance in fish production and optimal fish health, however, the full impact on industry competitiveness will not be known for several years. There is particular concern that projects in the area of new species diversification will not be pursued unless investment is available for development and commercialization activities.

The full extent of the impact of ACRDP on the aquaculture industry's competitiveness will not be known for several years. This is because many projects are not complete, and the full impacts of already completed projects will only become evident in the next few years.

Perhaps the biggest effect on the industry's competitiveness to date has been from projects conducted in the area of environmental performance. These projects have for instance provided information on disease transmission, and the nature and magnitude of the effect of aquaculture on its nearby environment. These research results have or will shape regulatory policies, which are expected to impact the number and location of aquaculture operations, and ultimately impact the volume of production, operating costs, and profitability of the industry.

The Strategic Review revealed that projects conducted in the field of best fish performance will require funding for development in order to fully benefit from the research conducted. Many operators are cash poor and cannot access financing from lenders or investors for development activities. Without money for development, the competitiveness of these operators is unlikely to improve.

Issue 9: Are significant changes occurring in industry and DFO technical capacity?

One of the objectives of the program is to increase the capacity for aquaculture research. There are two components to this capacity building: capacity in industry and capacity in DFO. Workshops and interviews also indicated that a number of DFO scientists have or will soon be retiring. There are concerns that these scientists will not be replaced, which would result in a decreased ability of ACRDP to be effective.

3.4 Cost Effectiveness

Issue 10: Is the current Program (design, delivery, and structure) cost effective in terms of results achieved?

There are design and delivery issues that affect the efficiency and effectiveness of ACRDP. As mentioned previously, there is a risk that firms may not be able to fully benefit from projects that conducted research in the area of new species diversification. If the funding is not made available for development activities, the cost effectiveness of these projects is undermined.

Many industry representatives complained that the associated hiring process is very slow and causes delays to projects. The DFO rates for term employees are relatively high. Furthermore, the positions are temporary rather than permanent, so when a project ends, the investment and their expertise are often lost.

There have also been issues with respect to the ACRDP budget. Industry representatives have stated that some money budgeted for ACRDP has been diverted to other DFO activities. Furthermore, there have been some budget delays and complaints from industry that SPA funds

(which hold industry contributions) have not been used on a timely basis. A senior DFO representative indicated that this may represent a misconception of the nature and dynamic of fiscal expenditures during the life of an ACRDP project. Finally, for the program to be effective in the long run, it was stressed by industry that funding for ACRDP should be long term and secure. There is concern that ACRDP funding is replacing A-base funding.

Issue 11: Are there more effective and efficient alternative means of delivering the program?

More efficient and effective means of delivering the program are discussed in Section 4.5.

4.0 Conclusions and Recommendations

4.1 Rationale and Relevance

This section concludes on the rationale and relevance of ACRDP and the need for the program to continue.

The Strategic Review concluded that the ACRDP is a relevant and needed program for the Canadian aquaculture industry. Based on domestic and worldwide demand for fish products, the industry has the potential to become much larger and more competitive provided that certain barriers can be overcome. However, the industry requires assistance in overcoming a number of challenges that are beyond its ability to address effectively. There is a negative perception of aquaculture among certain influential NGOs. The opposition to the industry seems to be particularly strong in British Columbia. The regulatory process for site licensing is more complex and slower than that for international competitors, and inhibits the size of the industry. In bringing a rigorous scientific approach to the issue of environmental impacts associated with aquaculture, ACRDP has the opportunity to clarify some of the misinformation that persists.

The industry includes small firms that are marginally profitable and do not have the financial means to invest in research and development that could improve its competitiveness. Projects funded by ACRDP and conducted jointly between industry and DFO scientists are helping to provide answers to issues of optimal fish health, developing new and better species, and best performance practices. The ACRDP program therefore plays an important role in the improvement of the industry's competitiveness and the transfer of knowledge from scientists to industry operators.

4.2 Design and Delivery

This section concludes on the effectiveness of the design and delivery of the ACRDP.

The Strategic Review concluded that program publicity has been adequate and awareness of the ACRDP is quite high across the country. To date, there have been more proposals than funds available, which would indicate a good flow of proposals. As a result, ACRDP has been able to generate high quality projects. The Strategic Review also found that industry project participants were particularly impressed with the quality of the DFO scientists. A review of ACRDP projects revealed that a good cross section of research is occurring and that most ACRDP participants are generally pleased with the application process. The Strategic Review found that the application process for ACRDP is satisfactory and that the regional management committee process has for the most part, been effective in selecting the best projects.

The Strategic Review concluded that a small amount of the research being conducted may be too academic and not responsive to the immediate needs of industry. It is important that all research topics are very relevant to industry, and that the information flowing from the projects can directly contribute to industry performance in some manner.

The Strategic Review concluded that dissemination of research results is appropriate, and in cases where industry has made a significant financial contribution to the project, adequate Intellectual Property protection is provided to industry. For many projects, research results are

formalized in the form of a report that is made available to industry. National and regional workshops are also a common mechanism for bringing people together to discuss research results. In the case of some projects, dissemination can occur through technical and non-technical factsheets that are placed on the DFO website.

Although the delivery of the program is satisfactory overall, the evidence gathered for the Review indicates that many firms lack the financial resources needed to conduct development activities that would allow them to use the research results to make their operations more competitive. Some indicated that their participation to future ACRDP projects would be difficult considering their financial situation and the requirement to provide financial contributions to projects.

4.3 Results / Success

This section concludes on the results and success of the ACRDP to date.

The Strategic Review concluded that many projects have already generated real benefits to the industry or have the potential to provide benefits in the near future. Industry participants were very impressed by the quality of scientific work performed by DFO scientists; enjoyed good working relationships; and several projects have since led to further collaboration.

The Strategic Review concluded that some ACRDP projects, particularly those in the area of environmental impacts have already or will soon positively impact the competitiveness of the industry. These projects have for instance provided answers regarding disease transmission, and the nature and magnitude of effects that aquaculture has on its nearby environment. These research results have already or will shape regulatory policies, which are expect to impact the number and location of aquaculture operations, and ultimately impact the volume of production, operating costs, and profitability of the industry.

4.4 Cost Effectiveness

This section concludes on the cost effectiveness of the ACRDP.

The Strategic Review concluded that there are design and delivery issues that have affected the efficiency and effectiveness of ACRDP. As mentioned previously, there is a risk that firms may not be able to fully benefit from projects that conducted research in the area of species diversification. If the funding is not made available for development activities, the cost effectiveness of these projects is undermined.

The Strategic Review concluded that the hiring policies and practices of the ACRDP impede the program's effectiveness. Many industry representatives complained that the hiring process is very slow and causes delays to projects. The DFO term employee rates paid to these employees are also relatively high.

4.5 Recommendations

Considering the above findings, the following recommendations are proposed.

1. According to TBS directions, a DFO researcher must be responsible for the execution of each project. Those researchers have the capacity to engage in collaborative agreements and contracts with other organizations and individuals. When cost-effective, these types of arrangements should be encouraged to compensate for areas of expertise as yet to be developed in DFO.

2. It is recommended that the definition of eligible industry partners be broadened to include industry service organizations such as feed companies.

3. While many industry partners are well established and go to ACRDP to increase their performance, a number are only entering the market and have few resources. Evidence from the review shows that for these and other partners, projects often face major barriers at the developmental or commercialization stage. Where commercialization is anticipated

as a potential outcome from an ACRDP project, proponents should engage economic development expertise early in the development of the project (e.g. WD, FedNor, DEC, ACOA).

4. In the consultant's view, if DFO is to help develop a sustainable industry, it should ensure that the program is accessible both to established and emerging organizations. In recognition of industry participants with limited resources, the program should develop greater flexibility in regards to industry contribution to ACRDP projects (mix of cash and in-kind contributions, as well as level of contribution). For smaller or emerging organizations, a 10% contribution (cash or in-kind) should suffice. This will ensure greater attribution. Leveraging from other sources should be further encouraged.

5. Concerns were expressed in the workshops about redirection of ACRDP funds to projects that have no industry participant. An effort should be made to ensure that no research funds from ACRDP are expended without an industry participant in the project.

6. Greater flexibility is needed to meet changing regional demands for research. It is recommended that ACRDP develop an approach to regional funding which permits a portion of funds presently notionally allocated to the regions to be available for re-allocation. This re-allocation will allow ACRDP to adapt to changing demands for services.

7. Despite the significant economic potential for the aquaculture industry, including in major economic-distressed areas, evidence from the review shows that a number of stakeholders object or are opposed to aquaculture for various reasons. These include NGOs, some portion of the general public, and some government representatives. ACRDP needs to review its communication strategy to support the development of sustainable aquaculture in Canada. In addition, an ACRDP communications strategy should ensure that findings and expertise within ACRDP is known by and available to the people and organizations that supply farm extension services.

8. ACRDP could also better promote the benefits of aquaculture to other DFO sectors. It is recommended a communications strategy be developed to communicate ACRDP and the industry's activities and benefits within DFO.

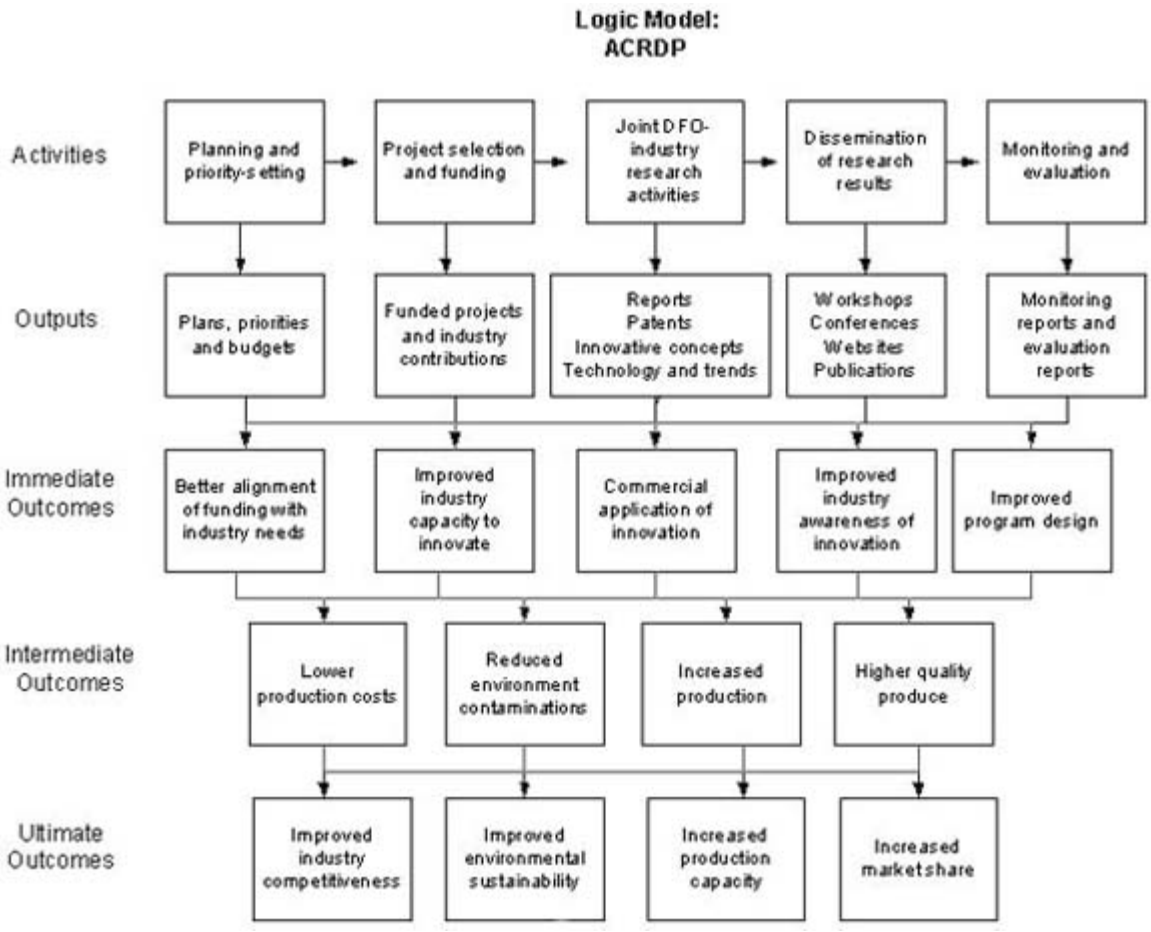
9. The results of this review show that senior DFO researchers will soon retire and leave a gap in DFO aquaculture research capacity. DFO needs to recognize this issue and ensure that a strategy is implemented to replace expertise lost through retirement.

Appendix A: Parameters for Next Review and Logic Model

This appendix outlines the broad parameters for the next review.

Overall Approach

As the focus of this review was on formative issues, the next review of the ACRDP program should focus on summative (results) issues. It is recommended that this review be conducted no later than 2007-2008. The following logic model can be used to guide the review.



Success Indicators

The following potential success indicators may also be used for review purposes:

	Indicators
Immediate Outcome Indicators	• Extent that research funding aligns with sector requirements • Evidence of increase/maintain research capacity (researchers and infrastructure) • # and examples of DFO collaborations • Evidence of continuing collaboration between DFO and industry • Satisfaction with DFO support • Extent to which science results have been incorporated into DFO policies and regulations • Extent to which research results are used by industry • New species/processes introduced by firms as a result of ACRDP
Intermediate Outcomes	• Examples of firms with: ◦ Lowered production costs and/or reduced losses ◦ Increased production output ◦ Improved survival rates ◦ Increased product quality ◦ Increased product diversification ◦ Meeting environmental standards

	Indicators
	• Level of public confidence in aquaculture • Examples of project success stories
Ultimate Outcomes	• Sustainable increases in sector output • Increases in sector market share • Increased sector profitability • Increased industry investment • Import replacement

The key issues to be examined in this review would include the following:

Relevance

- Are the mandate and objectives of the Program still relevant to the aquaculture industry?

Delivery

- To what extent have the recommendations from the previous review (2005) been implemented? Why or why not?
- Is the Program well designed and delivered?
- Are the projects high priority for industry? Are they relevant?

Success

- To what extent has ACRDP delivered high quality research?
- What research results are being produced for industry? Are they useful?
- To what extent has the ACRDP:
    - Achieved its intended objective of improving competitiveness?
    - Increased performance in fish production? (lower costs and/or higher production)
    - improved fish health?
    - Increased the industry's environmental performance?
    - Increase scientific capacity for essential aquaculture research and development in the aquaculture sector?
    - Been useful to DFO for policy and regulations?
- Are the project results being commercialized? Will they likely increase competitiveness?
- Has the Program achieved what was expected?
- What other impacts and effects result from carrying out this Program?

Alternatives and Cost-Effectiveness

- Is the current Program (design, delivery, and structure) cost effective in terms of results achieved?
- Are there more effective and efficient alternative means of delivering the program?

Methodological Options

As the review would focus on outcomes, the methodology should incorporate a mechanism to obtain results information from the project representatives. The following methods could be used:

- Key informant interviews;
- Case studies or telephone survey of project representatives;
- File review of projects;
- Expert panel; and
- International benchmarking of program with other similar programs from abroad.

Appendix B: Questionnaires

Guide 1: Key Informant Interviews

Name of Respondent: _____

Interviewer: _____

Date of Interview: _____

Organization: _____

The objective of the Strategic Review is to determine the extent to which the ACRDP is assisting the aquaculture industry become more competitive from a global perspective. In addition the Strategic Review is focused on the strengths and weaknesses of the program design and delivery in comparison to industry needs.

Your assistance in completing this Strategic Review is greatly appreciated and your reply will be kept confidential.

Industry Situation ACRDP Relevance

1. Please describe your involvement with ACRDP.

2. What are key challenges/opportunities currently facing your industry?
a. Economic
b. Technical
c. Environment

3. How has ACRDP assisted your industry in either meeting these challenges or taking advantages of opportunities?

4. Do you believe that ACRDP, the way it is constituted is responding to industry needs?

5. Is ACRDP providing value to industry overall?

Success

6. In what ways has ACRDP helped to improve industry competitiveness?
a. How important is it for the program to continue?
b. What would happen if the ACRDP is not continued?

7. What have been the key results that have emerged from ACRDP projects to your knowledge? Please provide examples?

8. Have the research results been useful to industry for commercial application? In what way?
a. If not what are the barriers?

9. What is required from the government side to ensure commercialization occurs? From the industry side?

10. In your view does industry have the capacity to absorb and utilize the research results?
a. If not, what are the barriers?

11. In you view are there any issues with respect to how intellectual property is treated by the government? Does this cause any problems for industry?

Design and Delivery

12. Is there adequate publicity to ensure that high quality projects are submitted by industry?

13. In your view does the application process work satisfactorily?

14. What is the process for project selection? Is it working?

15. Is the program design working in terms of?
a. Cost sharing
b. Eligible costs
c. Project planning and reporting

16. What in your view are the key sources of projects (industry and/or DFO)?

17. How well is the project approval process working?
a. Are the regional committees functioning?

18. What relative roles do the industrial partners play versus the DFO researchers?

19. In your view, how unique are the projects from a science perspective? Are they very applied research, or more towards exploratory research?

20. What has been the procedure for technology transfer? Is it working?

21. What has been the procedure for public dissemination of research results?
a. Is it working?

Alternatives

22. Are there more efficient or effective means of increasing competitiveness?

23. Are there improvements or changes required in the program design to make it wok better?

Guide 2: Company/Proponent Interviews

Name of Respondent: _____

Interviewer: _____

Date of Interview: _____

Type of Business/Sector: _____

Organization: _____

The objective of the Strategic Review is to determine the extent to which the ACRDP is assisting the aquaculture industry become more competitive from a global perspective. In addition the Strategic Review is focused on the strengths and weaknesses of the program design and delivery in comparison to industry needs.

Your assistance in completing this Strategic Review is greatly appreciated and your reply will be kept confidential.

Industry Situation ACRDP Relevance

1. What are the key challenges/opportunities currently facing your company?
a. Financial

b. Market
c. Human Resources
d. Equipment
e. Technology
f. Environment

2. Pricing or costs of production

3. How has ACRDP assisted you in either meeting these challenges or taking advantages of new opportunities?
a. What would have happened without ACRDP?

4. Please describe your ACRDP project
a. How was the project initiated?
b. Please briefly describe the project approach as well as the roles of DFO and your company in initiating and carrying out the project?
c. Has the project been completed? Or is it on track to meeting its objectives?

5. Do you believe that the ACRDP is responding to your company's needs?

6. Is ACRDP providing value to industry overall?

Success

7. What benefits do you expect from the ACRDP project?
a. Improved productivity
b. Reduced production losses
c. Improved fish health
d. Reduced environmental or regulatory problems
e. A new product
f. More efficient growth processes
g. Transfer of knowledge and technology from DFO?

8. Would you be able to achieve the goal of this project without the ACRDP project?
a. Is the ACRDP project likely to make your company more competitive? How?

9. What have been the key results that have emerged from your ACRDP project so far?
a. Overall was the project successful, and were your objectives reached?
b. Have you been able to apply any of the research results?
c. If not when do you anticipate being able to utilize the research results? d. What are the barriers to using the research results?

10. Is there any further support required from DFO or others to ensure downstream application of your research results?

11. In your view do you have the capacity to absorb and utilize the research results?
a. If not, what are the barriers?

12. In you view, are there any issues with respect to how intellectual property is treated by the government? Does this cause any problems for you in using the research results or does it in any way mitigate the competitive benefit attained from the project?

Design and Delivery

13. In your view did the application process work satisfactorily?
a. Was the project application straightforward?
b. Was the approval process timely?

c. Were the project selection criteria transparent and fairly applied?
d. Did the regional committee process work satisfactorily?

14. Is the program design appropriate in terms of?
a. Cost sharing
b. Eligible cost
c. Project planning and reporting

15. How well did the project approval process work?
a. Did you find the project approval process onerous?

16. What role did your company/organization play in the project? Versus the DFO researchers
a. Did your relationship with DFO work well?

17. What has been the procedure for transfer research results from DFO to your company staff? Was it successful?

18. What has been the procedure for public dissemination of research results?
a. Is it working?

Alternatives

19. Are there more efficient or effective means of increasing competitiveness?

20. Are there improvements or changes required in the program design to make it wok better?

Appendix C: Workshop Guide

The objective of the workshop is to obtain participant input concerning the extent to which the ACRDP is assisting the aquaculture industry become more competitive globally. In addition, the Strategic Review is focused on the strengths and weaknesses of the program design and delivery in comparison to industry needs. Finally, a presentation will be made of a program logic model and the Strategic Review indicators proposed to assess the performance of the ACRDP.

Your assistance in completing this Strategic Review is greatly appreciated and your reply will be kept confidential.

Workshop Organization

The workshop will be a one-day workshop with the following schedule.

9:00 AM to Noon – Morning discussion: strengths, weakness, opportunities and threats facing the industry and the strengths and weakness of the program

9:00 – 9:30 AM. Introduction to the workshop

9:30 –11:00 AM. Breakout groups

There will be four breakout groups, two groups will discuss the strengths, weaknesses, opportunities and threats facing the industry and two groups will discuss the strengths and weaknesses of ACRDP? The following outlines some of the topics that can be addressed:

Issues for discussion – industry SWOT analysis:

- What are the key challenges/opportunities currently facing your Industry in this region?
- What are the new opportunities for the industry
- What are the threats that the industry must address?
- What are the key needs that a program such as ACRDP can address?

Issues for discussion –ACRDP SWOT analysis:

- What contribution is ACRDP making to individual companies? To the industry?
- Is there any further support required from DFO or others to ensure downstream application of the research results?
- Do companies have the capacity to absorb and utilize the research results?
- Has DFO successfully transferred research results and capacity to partner companies?
    - If not, what are the barriers?
- Is the application and approval process working satisfactorily?
- Is the program design appropriate in terms of?
    - Cost sharing
    - Eligible costs

11:00 AM – Noon: Plenary Session, Group Presentations and Conclusions

- Overall, what are the strengths of the program?
- What are the weaknesses of the program?
- Are there improvements or changes required in the program design to make it work better?
- Are there opportunities that are being missed because the program does not address them?

12 –1:30 PM Lunch Break

1:30 PM-5:00 PM Afternoon: Presentation of Logic Model and Performance Indicators

1:30 –2:30 PM Presentation of draft logic model for the ACRDP and key performance indicators
A presentation will be made by the consultants of a draft logic model for the program as well as the key indicators that are proposed for the Strategic Review of the program.

2:30 – 3:30 PM Breakout groups (3 or 4 groups)

Discussion of logic model and performance indicators, and suggestions for improvement.

3:30 – 4:30 PM Plenary Session presentations

4:30 PM Closing Remarks

Appendix D: Strategic Review Issues

Some of the key issues to be examined in this Strategic Review:

Relevance

The continued relevance of the ACRDP will be key to this Strategic Review. Evaluating the ACRDP's relevance will require answering the following questions:

- Are the mandate and objectives of the Program still relevant to the aquaculture industry?
- Is the Program meeting the needs of the Canadian aquaculture industry?

Success

- To what extent is the ACRDP achieving its intended objective of improving competitiveness?
- What research results are being produced for industry? Are they useful?
- Are the project results likely to be commercialized? Will they likely increase competitiveness?
- How do projects actually end up being exploited or commercialized?
- What are likely to be the results and outcomes of the research products? How will they support the industry?

- Are the research projects responding to industry needs? Are they being appropriately communicated and/or transferred to industry?
- Are the research results being given adequate intellectual property protection to ensure that the benefits are retained by Canadian industry?
- Has the Program achieved what was expected?
- What impacts and effects (both intended and unintended) are likely to result from carrying out this Program?

Design and Cost Effectiveness

- Is the application process for ACRDP: funding fair, competitive, timely and responsive?
- Are the projects driven by industry demand or by DFO "supply"? Are the projects truly industry driven?
- Are the projects high priority for industry?
- Is there adequate program publicity in order to generate high quality projects?
- How effective has the regional management committee process been in selecting the best projects?
- What types of projects are being rejected?
- Has DFO established appropriate ways to disseminate information on the research being carried out?
- Has industry established appropriate ways to ensure uptake of the research?
- Does industry have the capacity to adequately utilize the research results in terms of investment in processes, capital equipment etc?
- Are all of the necessary ingredients in place to ensure that industry capitalizes on the ACRDP funded research?
- What are the barriers to downstream implementation?
- Are there more effective and efficient alternative means of delivering the program?
- Is the Program well designed and delivered, or are there significant modifications which need to be made to increase its efficiency and effectiveness?
- Is the current Program (design, delivery, and structure) cost effective in terms of results achieved?

Appendix E: Bibliography

Brundtland, G.H. and M. Khalid. Our Common Future, World Commission on Environment and Development, 1987.

DFO, Federal Aquaculture Development Strategy, Canada, 1995.

DFO, The Program for Sustainable Aquaculture Strategic Review: Terms of Reference Project 65143, August 2004.

Nash, C.E. (Editor), 2001. The net-pen salmon farming industry in the Pacific Northwest. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-49, 125 p.

National Marine Fisheries Service, Southwest Regional Office, NOAA'S Aquaculture Policy.

National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, Fisheries of the United States 2002, pb. 2003.

National Science and Technology Council, Health, Safety, and Food Committee, (NSTC 1), Aquaculture Research and Development Strategic Plan, undated.

NSTC 2, Committee on Science Subcommittee on Aquaculture Update Sept. 13, 2002.

United Nations, Food and Agriculture Organization, The State of the World Fisheries and Aquaculture 2002, pb. 2004.

United States Department of Agriculture (USDA), Aquaculture Policy circa 2000.

United States Department of Agriculture (USDA), Aquaculture Outlook/LDP-AQS-20/October 8, 2004.

United States Joint Subcommittee on Aquaculture, (JSA 1) Cover page, http://ag.ansc.purdue.edu/aquanic/jsa/statistics/index.htm

U.S. JSA, National Coordinator for Aquaculture New Animal Drug Applications' Ninth Annual Report of Activities May15, 2003 to May 14, 2004 http://ag.ansc.purdue.edu/aquanic/jsa/aquadrugs/progress520reports/Ninth%20Annual...

U.S. JSA, National Science and Technology Council Health, Safety, and Food Committee, Aquaculture Research and Development Strategic Plan (Undated).

U.S. JSA, National Science and Technology Council, Committee on Science, Subcommittee on Aquaculture, Update, Sept. 2002.

Waknitz, F.W., T.J Tynan, C.E. Nash, R.N. Iwamoto, and L.G Rutter. 2002. Review of potential impacts of Atlantic salmon culture on Puget Sound chinook salmon and Hood Canal summer-run chum salmon evolutionary significant units. U.S. Dept. of Commer., NOAA Tech. Meme. NWFS-NWFSC-53, 83 p.

Date Modified: 2011-03-07