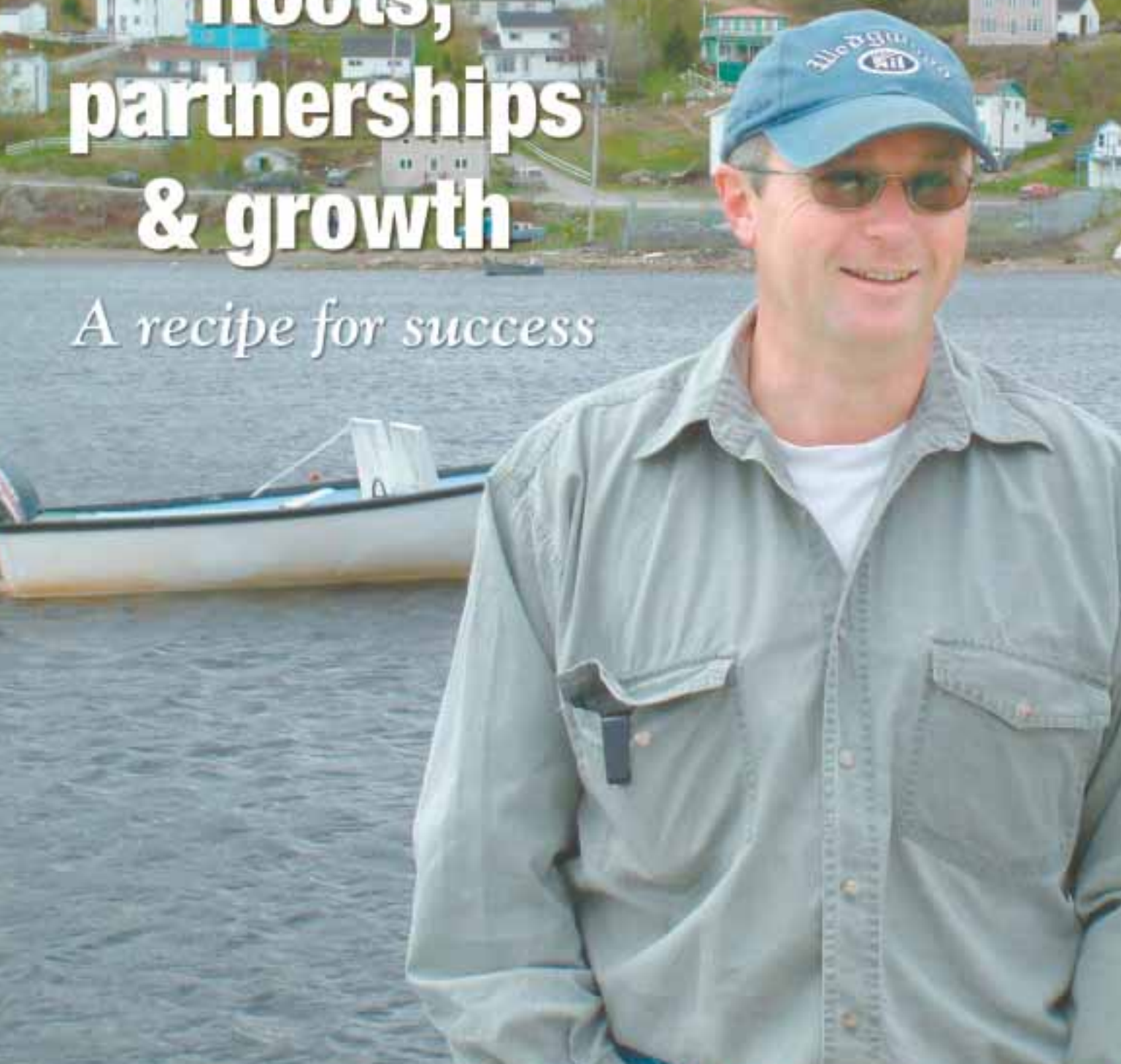




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this issue

Oldest operating salmonid farm
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In 1993 Vernon Watkins was approached by Calvin Hunt for help in starting up a salmon farm. His advice to Calvin was “drop the idea and try something else ... anything else, perhaps a mussel farm.” The mussel farm was started but Calvin was persistent about salmon farming and a year later Long Island Resources was formed.



the industry

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The Cold Harvester is a partnership between Optipress Publishing and the Newfoundland Aquaculture Industry Association. The Cold Harvester, which serves the Newfoundland aquaculture industry, is published four times per year.

For information on advertising, contact **Bob Windsor**, Industry Publications Division account executive
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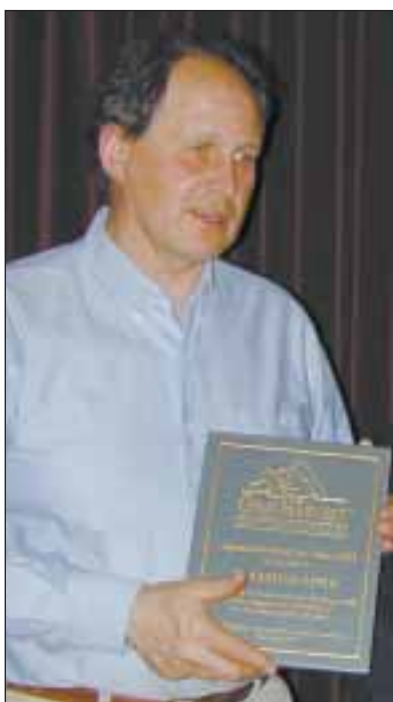
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Optipress
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Canada Post Publications
 Sales Agreement # 1442716



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Atlantic Canada's rich traditions, experience, innovations and excellent transportation facilities via air, sea and land, all play a key role as the industry continues to develop innovative ways to grow its business.

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Having built up the country's aquaculture industry from virtually nothing 30 years ago into the world's largest exporter of salmon and trout, Norwegian technology and expertise are in demand to fish farmers worldwide.

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Jonathon Moir, president of Northern Aquaculture Corporation, was recently selected as NAIA's Aquaculturist of the Year. He is very well-known and respected for his influential and pioneering work in the development of the cod aquaculture sector in the province.

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From a Fish Health standpoint Producers, Government and Academia are working towards a common goal. Maximize production through good fish health practices and utilize a policy framework that enables that goal.

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The aquaculture industry in the Coast of Bays region has continually grown since its inception. It is commonly referred to as the aquaculture capital of Newfoundland and Labrador with good reason. All four of the species identified in the provincial strategic plan – Mussels, Rainbow trout, Atlantic salmon and Cod are all commercially grown here.



NAIA

Executive Director

MIKE ROSE

My first encounter with a personal computer was in 1982. Andrew, one of the students on our floor, set up a Commodore 64 in his room that fall. I remember peering at the weird glow coming from that dorm room and generally thinking that Andrew, as nice a guy as he was, was a bit out of touch. As you probably guessed, Andrew developed a very successful career for himself in the information technology sector. But to most of us in 1982, a world filled with computers was science fiction and the concept of an “IT sector” was a remote idea. Much has changed of course, and very, very quickly.

In 2003, we can clearly look back at Andrew and his Commodore 64 and recognize that he was ahead of his time in 1982. As a matter of fact, we could have said the same thing by 1990 when it was clear that personal computing was no passing fad. It seems Andrew’s personal goals in 1982 were a preview of the future.

Interestingly, some groups look at the aquaculture industry today somewhat like I looked at Andrew and his toy in 1982 – an interesting diversion but not something to be taken too seriously. There are even groups who view the industry as dangerous. But, make no mistake about it, the global aquaculture industry of 2003 is merely a hint of what is to come. Just as the computer marched inexorably into the mainstream, rest assured that aquaculture will do the same. Aquaculture already produces over two-thirds of the world supply of seafood. Sustainable Farming on the water instead of the land just makes too much sense, especially given the obvious pressures on wild stocks.

When compared with global aquaculture industries, the aquaculture industry in Newfoundland and Labrador is in its infancy. It is only since the 1992 cod collapse that the sector has received attention and modest investment. More recent decimation of the wild stocks should focus serious attention on the opportunity here in our unique province. What a terrific setting for aquaculture!

We have 17,000 kilometres of coastline of clean,

cold water. In particular, the south coast of the province is relatively ice-free in winter and offers highly suitable conditions. Due to the abundance of coastline, aquaculture farms are often miles apart in remote locations. Furthermore, our industry has voluntarily adopted a system of extensive site fallowing that ensures localized operating areas are regularly flushed. That significantly reduces the possibility of unacceptable localized impacts. Food quality and environmental safety issues are minimized and excellent growing conditions make this province highly suitable for several commercial species, especially salmon, trout, cod and mussels.

Newfoundland is one of very few places in Canada with abundant aquaculture space available. This makes it an attractive investment option. Various international investors have already recognized this and are currently partnering with Newfoundland interests to grow our industry. Asian and European investment in Bay d’Espoir, for example, is sending a strong signal around the globe. Here is the bottom line on the Newfoundland aquaculture opportunity: We have the potential for a new industry worth hundreds of millions of dollars per year, i.e., every year, on a sustainable basis indefinitely into the future.

As a new aquaculture jurisdiction, Newfoundland can learn from others and make every effort to do things right the first time. In addition to designing area management and environmental protection plans, our industry players are eager to participate in the development of a “seal of excellence” program that defines expectations and standards for the growth, production and delivery of quality aquaculture foods. This will be attractive to investors, food buyers, end-consumers and governments.

Just as the dreams and persistence of my old friend Andrew, Bill Gates and others in the early 1980s set a course for all of our futures, rest assured that today’s aquaculture pioneers are on a direct path toward the future of global fish protein production. And to each and everyone I say, ‘Carpe Diem’ does not mean ‘fish of the day!’



Vernon Watkins at his office in St. Alban's preparing to take operations to a new level.

One of Newfoundland's oldest operating salmonid farms

In 1993 Vernon Watkins was approached by Calvin Hunt for help in starting up a salmonid farm in the Gaultois area. Vernon had been involved in the early days of the aquaculture industry in Bay d'Espoir and was quite familiar with problems related to financing this type of operation, as well as struggles dealing with government on critical strain-related issues. His advice to Calvin was "drop the idea and try something else ... anything else, perhaps a mussel farm."

The mussel farm was started but Calvin was persistent about salmonid farming and a year later Long Island Resources was formed. Vernon found himself back in the industry he had left in 1990.

The mussel farm is long gone but Long Island Resources remains as the one of the oldest operating salmonid farms in the province.

"Looking back on it," says Vernon, "there were many memorable and not so memorable moments. The worst was

probably one New Year's Eve when Boyd Pack called me to say that ice had moved near the cage sites, we could have lost everything. Fortunately we didn't and we learned from that, but there were many trying times." Vernon went on to explain how his company and the industry in general identified and developed suitable farm sites and farming methods that worked for the Bay d'Espoir area. He also recalled the critical struggle in those days to convince government to release the industry from the severe restrictions that prevented the importation of better performing strains of fish.

Vernon is most proud that the company has been able to retain a group of core employees who have been there since the start. "Most are from Gaultois and several came off the TAGS program to come to work for the company. I am proud to say they've been here ever since," he reflects. It is

➔ Please see page 4

“We have a very strong team in place and a sound production and marketing plan.”

From page 3

this kind of dedication that has allowed Long Island Resources to survive during some very difficult times. It is also noted that the company was never very good at attracting government money, therefore, says Vernon, “they had to focus on being efficient and lean, though some might say miserly.”

By 2000, however, a series of factors weighed in to cause a major shift in direction. Inefficiencies due to operating as a small independent company, cash losses from old debt and production problems, and reduced prices due to competition from Chile and bankruptcy sales in Nova Scotia, exacted a toll on the company. Vernon realized they had to do something or they would be in real trouble. While their main financiers provided some temporary relief from the debts, Vernon went looking for new investment or partners.

Welcomed relief came relatively quickly in the form of a Norwegian aquaculturist, Mr. Knut Skeidsvoll. Vernon had met Knut at an AquaNor Conference. Both recognized that the crux of the problem was low volume and lack of control over the major inputs of the company. Knut was already quite familiar with the farming conditions on Newfoundland’s south coast and was confident about the opportunities. In fact, Knut brought in a second Norwegian company and some considerable investment was made.

In fairly short order, the former char hatchery at Daniel’s Harbour was purchased and renovated. A new farming company, Nordland Aquaculture Ltd., was incorporated. Shortly after that, Conne River Aquaculture Ltd. was purchased and later renamed Markland Seafoods Ltd. Along with Markland came another major asset, Clyde Collier, who has been involved with the industry in Newfoundland longer than anyone. Clyde brought an invaluable wealth of experience and knowledge. Additionally, Markland landed the operations many valuable, seasoned employees who continue to play a major role in the company.

With these swift moves in place the combined group commanded enough volume to improve operational efficiencies. More recently, the group has begun doing its own marketing and it is also looking at various processing options. At a current production level of 3000 mt, the group has one of the largest aquaculture production cycles in the province.

The Newfoundland-Norwegian trio plan to increase their volumes to 6,000 mt by 2005, with a combination of trout and salmon. The group is confident in the future of trout but does not want to repeat mistakes made by others in the past by overproducing large trout in what is in reality a fairly limited market. Expansion plans for the hatchery are well underway with the first salmon smolts to go to sea in the spring of 2003.

Vernon explains that there is also interest in cod aquacul-

ture. Long Island Resources is currently involved in the cod project with the Ocean Sciences Centre and the major players in cod in the province. Knut has had a lot of experience with cod and, in fact, he was one of the original cod farmers in Norway over 12 years ago. However, creating a vertically integrated cod operation, from hatchery up, requires a tremendous amount of money. Vernon notes, “There is currently a lot of focus and effort in developing one cod hatchery in Newfoundland, so it is unreasonable to expect support for another at this stage.” However, the group is hopeful it will have access to cod fry from the new hatchery and that it plays a role in helping to build a successful cod aquaculture industry in the province.

When questioned on current challenges Vernon states, “The single largest obstacle facing the overall operation is financing. Unfortunately, traditional sources of financing for aquaculture in other areas, such as the banks, Farm Credit Corporation or government guaranteed loans are not accessi-

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Norwegian partner, Knut Skeidsvoll, marketing representative Una Walsh, and Vernon stop by the NAIA booth at the March 2003 Boston seafood show where the company had great success.

Future looks very promising

From page 4

ble in Newfoundland.” While a considerable amount of private investment has been placed in the operation, additional sources of financing are required. But Vernon and his partners are reasonably optimistic about the future. “We have a very strong team in place and a sound production and marketing plan.” Prices for trout and salmon remain stable, and farmed cod is a very real opportunity in Newfoundland and Labrador. The future for this group of businesses looks very promising.



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In defence of Atlantic Salmon Aquaculture

According to her recently exposed E-mail, Lynn Hunter of the David Suzuki Foundation states she is a sweet person who enjoys tormenting fish farmers. Lynn is having way too much fun doing just that, so even though she has apologized, I doubt that she will stop anytime soon.

I've been around this industry for 20 years and have nothing but respect for passionate debate about aquaculture. BUT, I am fed up with misinformed attacks on our industry. Yet we should all be encouraged to hear that pro-aquaculture people are marching in the streets of British Columbia. We need more champions like that, a lot more champions!

Aquaculture is not perfect. The industry does have issues but we are using science to contend with these issues. We shall make mistakes and poor choices but the key will be in how we deal with such choices. However, at the end of the day this is a great industry for Canada and those involved care as much about THEIR environment and the future of our planet as the media-hungry, self-righteous and self-appointed guardians – the Lynn Hunters of the world. Who gave these people the monopoly on caring for this planet? These non-governmental organizations are economic machines unto themselves and tug at the heartstrings of the world's public for the funding to launch and fuel their "causes."

Aquaculture in Canada is a rural-based, science-based and market-based enterprise. This industry is proud to be providing much needed jobs and careers in rural Canada. Scientifically we can, are and will contend with negative issues that may result from our industry. The science of today is not the science of tomorrow and the dramatic increases in feed quality and FCRs (feed conversion rates) over the last 16 years attest to that. In our market base, per capita consumption of salmon has grown from 0.1 lb. to over 2.0 lbs. in the last 12 years, while overall seafood per capita consumption has declined in North America. Why? Because Canadian fish farmers have produced fresh, sumptuous, high quality, reasonably priced salmon, available year-round for both retail and food service customers. Add to that the many, many nutritional reports that are published almost daily promoting the health benefits of eating oily fish, including salmon. This is indeed a wonderful food source for global consumption.

It is a long and accepted tradition to take our children for Sunday drives in rural Canada admiring the beautiful, pro-



Brian Rogers

ROGERS CONSULTING INC.

ductive farms bursting with livestock. On the other hand a productive, successful fish farm is considered a blight on the seascape. What about the waste from these farms? Statistics Canada reports that in 1996 livestock farms in Canada produced 133 million metric tonnes of manure. As for the quality of that manure – one only needs speak with the people of Walkerton, Ontario about that. And how ironic it is that a vegetarian like a cow should develop Creutzfeldt-Jakob disease (Mad Cow Disease), that is acquired by eating animal flesh. A flesh eater like salmon will soon be eating plant-based feeds, the scientific development of which is yet another success for the science base of our industry.

While we are on the topic of fish feed and waste, why is it that the fecal waste of cows and sheep is bagged and sold at Canadian Tire as fertilizer/manure while the fecal waste of a salmon is categorized as pollution. And who says it's pollution?? Could it be possible that the quality of the fish 'manure' would be superior to the other manures?

As I write this I have an article in front of me from a Halifax newspaper entitled, "The Joy of Seed Exchanges." This article goes on to say that "you can collect, grow and enjoy plants from around the world through a seed exchange." The article lists seven (7) Web site-based seed exchanges. Where is Lynn Hunter, David Suzuki and Greenpeace?.....Apparently, there is a lot more money in seal pups and salmon farms. What about the potential for genetic pollution from these relocated plants developed as a result of slips and grafts shared amongst the neighbourhood?

Our industry has been accused of threatening the conservation of wild salmon stocks – Atlantic and Pacific. As you read on, remember that as an industry of any consequence, we have only been in existence for about 12 years. Aquaculture is not the root cause of the current sorry state of wild Atlantic and Pacific Salmon. It's not even a major contributor. Mismanaged capture fisheries and habitat destruction in freshwater and saltwater over many, many years are the real cause. Where has NASCO (North Atlantic Salmon Conservation Organization) and the PSC (Pacific Salmon Commission) been? These two organizations have been travelling the globe and meeting in exotic places since the 1980s. But has this resulted in an increase in Atlantic or Pacific salmon in our oceans and rivers? These are the only numbers that matter. If the answer from both of these organizations is that science is second to politics, then save the travel budgets, the overhead costs and fold the institutions. I do understand that things are much more complex than I've suggested, but perhaps that's the problem. The acid test for these institutions is/are the number of fish in the rivers and oceans of Canada.

Apparently, memories are short. Consider the 200 years of impacts on wild Atlantic and Pacific salmon stocks from acid rain, logging, agricultural run-off, dams, human development along rivers and bays, recreational activities including hook-and-release fishing and commercial fisheries, regulated and unregulated. Add to that the most recent studies

➤ Please see page 17

Dedicated aquaculturists, such as this group in Fortune Bay led by Doug Caines of North Atlantic Seafarms, are leading the way to increased production of safe, high quality seafood for international markets.



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Creative product development fuelling Atlantic Canadian fishery growth

Aquaculture is an important strategic sector

BY DOUG SCOTT
ACOA

Canada boasts the world's longest coastline and a reputation as one of the world's leading exporters of seafood products. And Atlantic Canada, with its four seaboard provinces, accounts for the major portion of the rich variety of harvested and processed groundfish, shellfish, and pelagic products exported worldwide. In 1996, Atlantic and Pacific Canadian landings totalled more than 925,000 tonnes with Atlantic landings accounting for almost 68 per cent of that. The Atlantic coastal fishery, rich with diverse resources, has a long and distinguished history – and the Atlantic Canada Opportunities Agency is proud to play a role in the development of new products and an expanded aquaculture industry in the region.

The Atlantic region is recognized internationally for its industry leadership and innovation. Here you'll find the world's leading producer of canned sardines using juvenile herring, a packing and shipping system allowing live lobsters to be delivered anywhere in the world, applications of advanced technologies in such diverse areas as control of lobster molting cycles and development of a deck-mounted airlift harvester for easy sea urchin retrieval.

In today's global marketplace, Atlantic Canada's rich traditions, experience, innovations and excellent transportation facilities via air, sea and land, all play a key role as the industry continues to develop innovative ways to grow its

business and successfully addresses the challenge of coping with diminished resources in its traditional groundfish industry.

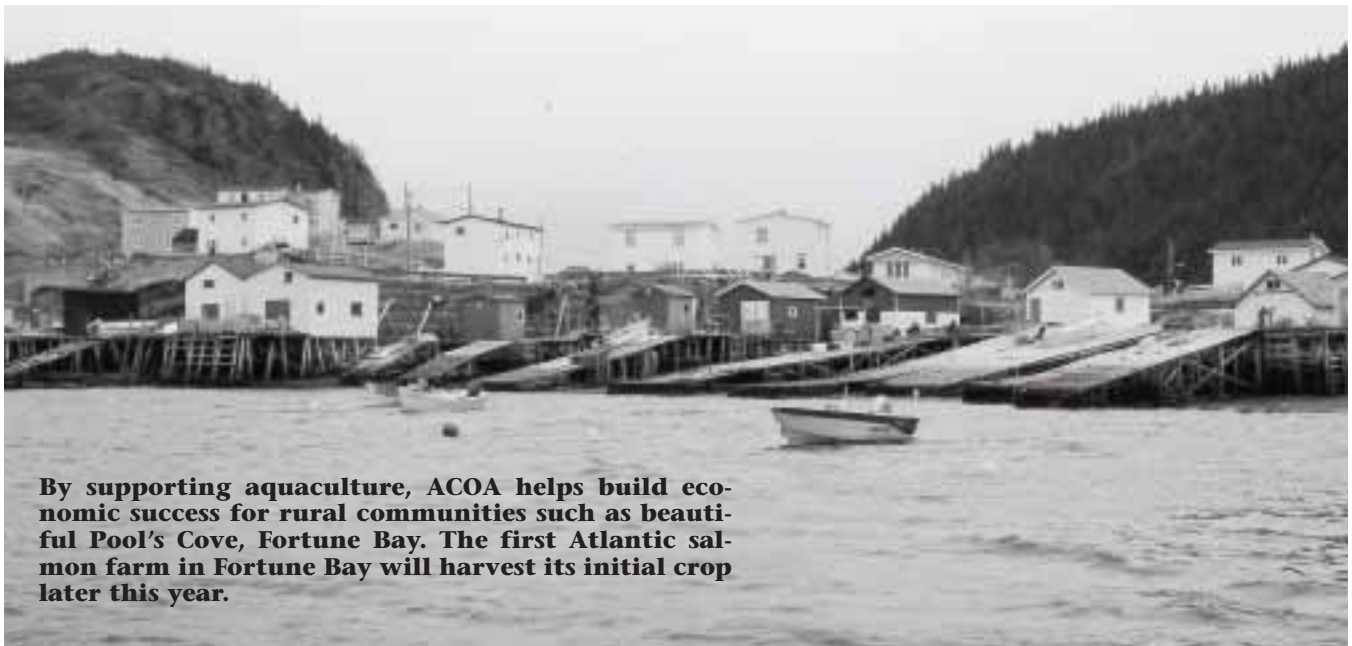
New Challenges, Products and Markets

Careful planning, dramatic shifts in direction and integration of ecological concerns are breathing new life into the Atlantic fishery, gradually transforming the sector from a traditionally resource-driven one to a market-driven sustainable fishery. Demonstrating both creativity and initiative, the Atlantic fishery and its fish processing industries are experimenting with traditional species, developing markets for non-traditional and under-utilized species, applying new technologies to a growing aquaculture industry, and targeting specialized markets worldwide with everything from sea urchins to Irish moss to frozen herring roe. Emphasis has been on rebuilding and maintaining fish stocks, product development and on remaining competitive by adopting harvesting and marketing strategies that best respond to domestic and world customer demand for quality products and service at competitive prices.

Eliminating Barriers

While the United States accounts for the majority of exports from Atlantic Canada, location and quality product diversification have helped the region capture significant

➔ Please see page 9



By supporting aquaculture, ACOA helps build economic success for rural communities such as beautiful Pool's Cove, Fortune Bay. The first Atlantic salmon farm in Fortune Bay will harvest its initial crop later this year.



Cod aquaculture industry represents significant new possibilities. Here on the cod farm in Hermitage Bay, a new breed of aquaculturists, Chris Rose and Jim Fudge, listen as site manager Jennifer Caines explains feeding patterns to ACOA's Georges Lambert (all left to right).

Opening doors to additional market opportunities

From page 8

markets in both Europe and the Pacific Rim. Trade agreements – the Canada/U.S. Free Trade Agreement, the North American Free Trade Agreement and the Uruguay Round of GATT – are opening doors to additional market opportunities every day.

Enhanced export competitiveness is the key word in the industry throughout the Atlantic region, particularly for processed fish products exported to Europe, Japan, and the Republic of Korea. Key areas of interest are crab, lobster, herring, livers, roe, frozen fish, shrimp, frozen fillets, halibut, mussels, salted fish, scallops, and mackerel.

All that restructuring and redirecting is bearing fruit, generating profits and growth across the Atlantic region. Newfoundland and Labrador, hit hard by the downturn in groundfish stocks in the early 1990s, posted its highest ever

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Aquaculture industry holds great potential to create jobs for rural parts of the region

From page 9

figure for total commercial landings in 1998 – some 250,000 tonnes worth \$384 million.

And for larger national and international companies in the sector, new approaches are paying off as well. Newfoundland-based Fishery Products International Limited boasted a net income of \$8.2 million in 1997, a 34 per cent increase from 1996. Sales reached a record level of \$676 million, highlighted by an 11.5 per cent increase in value-added sales.

FPI is processing record amounts of cold water shrimp and has invested almost \$12 million into upgrading two processing plants. And Nova Scotia- and Newfoundland-based High Liner Foods Incorporated (formerly National Sea Products) saw consolidated sales for 1997 increase almost 10 per cent to \$278 million, thanks in part to new product innovation. High Liner, founded in 1899 in Lunenburg, Nova Scotia, ended the year with a net income of \$8.6 million, a 145 per cent increase from the year before.

Aquaculture Growth Fuelled by Environment and Technology

Processing and marketing of fish and shellfish harvested from the wild resource still accounts for the majority of the industry's products. However, an ideal Atlantic coastal environment has allowed the growth of an aquaculture industry with a range of species including salmon, trout, cod, oysters and mussels – all attracting growing shares of world markets for the four Atlantic Provinces.

The industry has enjoyed significant growth in the salmon aquaculture sector, led by the environmentally suited Bay of Fundy region of New Brunswick. It's now home to more than 79 farms. Total salmon aquaculture production in the province was 14,000 tonnes in 1998 with a dollar value of \$120 million. Three quarters of the production was exported to the United States. In the last 10 years, the number of aquaculture farms in New Brunswick has increased 250 per cent while production has increased 30-fold and the province's aquaculture industry is becoming increasingly diversified, with the farming of other finfish as well as shellfish.

In Prince Edward Island, mussel and oyster production topped 11,000 tonnes in 1997. P.E.I. is home to 87% of the Canadian-farmed mussel production.

Nova Scotia is branching out, too. Besides Atlantic salmon, steelhead trout, mussels, oysters and scallops, Nova Scotia operators are fish-farming quahogs, sea urchins, dulce, clams and eels. Total production in Nova Scotia in 1997 was 3,000 tonnes.

Atlantic salmon, trout and mussel production is leading the way in aquaculture growth in Newfoundland and Labrador. With salmonid operations concentrated on the south coast and mussel production on the northeast coast, there remains a great deal of room for significant growth in

the production of those species. Newfoundland and Labrador is also on the eve of very exciting developments in cod aquaculture. The successful growing out of cod fingerlings in open sea cages in Hermitage Bay since 2001, as well as the opening of its first commercial hatchery in 2003, is setting the stage for an intensive cod aquaculture sector in Newfoundland and Labrador.

The assistance programs from ACOA for the aquaculture industry supports three main areas: extension services mainly of a biological nature; incentive programs directed at industry members to increase mussel production; and technology transfer for the salmonid and mussel sectors of the industry. Specific emphasis is placed on aquaculture technology, human resource development, quality management, aquaculture health services, and marketing and intelligence, among other initiatives.

"The aquaculture industry holds great potential to create jobs for rural parts of the region, which is especially important given the decline of the traditional fishery," said the Minister of State for ACOA, Gerry Byrne. "ACOA believes that aquaculture is an important strategic sector for all four

← Please see page 11



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ACOA's Paul Strickland and George Lambert, on the right, listen as hatchery expert foreman Charlie O'Driscoll, second from right, explains the intricacies of properly installing tanks at the Bay Roberts cod hatchery.

Growth fuelled by environment, technology

From page 10

provinces, and we are pleased to support provincial governments as they work with the private sector and other partners to develop the industry. “

“The fishing industry has undergone a dramatic transformation in the past decade. In part because of aquaculture development, today's fishery is more diversified and more sustainable economically over the long-term,” he said. The Newfoundland and Labrador aquaculture industry has experienced significant growth in recent years. From 1995 to 2001 total aquaculture production in the province increased from 1,029 tonnes to 5,375 tonnes. The value of production has shown an even more dramatic increase, from \$3.5 million in 1995 to approximately \$20 million in 2001.

• *Note: All dollar figures are in Canadian funds unless otherwise stated.*

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Promoting collaboration in aquaculture between Canada and Norway

Norwegian Trade Council to host seminar

BY LORI WOLOSHYN
NORWEGIAN TRADE COUNCIL

Norway, as one of the world leaders in aquaculture production, has contributed enormously to the efficiency of modern aquaculture through applied research in key areas such as feeds, selective breeding and fish/shellfish reproduction cycles and with the development of durable high-quality equipment. Having built up the country's aquaculture industry from virtually nothing 30 years ago into the world's largest exporter of salmon and trout, Norwegian technology and expertise are in demand to fish farmers worldwide.

With the continual development of these advancements, Norway has attained the status of the world's leading producer of farmed salmon. In 2001, Norway produced 415 000 tonnes of Atlantic salmon which equates to over 40 per cent of world production. However, with the turbulent salmon markets, increased risk of disease, and the desire for product diversification, Norway is looking towards new species such as cod, and halibut.

With intensive research in cod production, cod farming has developed successfully in Norway. In 2001, 280 cod farming licenses were allocated, and over three million juveniles were produced. It is expected that cod juveniles will reach 64 million by 2005 and that over 200,000 tonnes of cod will be farmed. Farmed cod could therefore account for considerable volumes of deliveries, as wild catch of cod continues to decrease. Prominent salmon producers like Grieg Seafood, Fjord Seafood, Marine Farms, Pan Fish, Nutreco and Stolt Sea Farm in Norway have all diversified into cod farming.

Wild Atlantic halibut is a high priced species in low supply. Aquaculture research on this species has been ongoing in Norway, the United Kingdom, Iceland and Canada. After 15 years of research in fry production of halibut, Norwegian researchers are realizing the true potential of halibut farming. Substantial investment in research and development has enabled Norway to take a leading role in the progress of halibut farming as the industry continues to grow. What started

with two halibut in 1985 at the Austevoll Research Station resulted in a harvest of 300,000 fish in 1994. Sales of halibut produced through fish farming was 376 tonnes in 2001. Production technologies for halibut farming are steadily advancing as is also the case for technology development for spotted wolffish, turbot, and arctic char. Catfish farming is also being studied closely.

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Leading innovators, scientists will share experiences, industry technologies

From page 12

As the natural fish stocks continue to decrease, it becomes increasingly important for countries to develop their aquaculture industry. The development of international contacts and the sharing of knowledge will help to decrease obstacles in the path of the aquaculture industry worldwide. Last autumn, a science and technology forum on the collaboration of research between Canadian and Norwegian research institutions was launched. This initiative prioritizes scientific projects within the aquaculture sector, and in February 2003 an MOU between AquaNet, the Canadian Network of Centres of Excellence in aquaculture research and the Norwegian Fiskeriforskning, an internationally recognized leading Institute of Fisheries and Aquaculture Research was signed in Ottawa. Under the agreement, funds will be created to support research and personnel exchange. The Honorable Robert Thibault, Minister of Fisheries and Oceans, and the Norwegian Minister of Fisheries, Mr. Helge Ludvigsen, strongly supported the initiative.

As an outcome of this collaborative agreement, the Norwegian Trade Council is hosting an aquaculture seminar on the Collaboration of Research and New Technologies between Norway and Canada on June 11, in St. Andrews, New Brunswick. In this unique seminar, leading innovators, and scientists from both countries will share their experiences and industry technologies. One of the important tasks for the upcoming event is to get feedback from the industry on additional possible collaboration projects between the two countries.

This year's topics will include: Collaboration in Research, New Species (cod, wolffish, and halibut), Feed and Feeding Technologies, and Fish Health/Disease Management. Both Fiskeriforskning and AquaNet will share their accomplishments in collaboration, and leading finfish producers Nutreco, Scotian Halibut and Great Bay Aquaculture will exchange views on successful cod and halibut production. Storvik, Aqualine and Arena will address latest technologies in feed systems for new species. AlphaPharma will look at the developments of managing ISA, and the effects of vaccine potency, disease risk and market price on the economic value of fish vaccination. The day will end with a brief look at how the two countries have dealt with environmental groups. The Society for the Positive Awareness of Aquaculture (SPAA) will present the Canadian perspective while Fiskeriforskning will discuss the Norwegian approach to this issue.

Following the seminar, Norwegian delegates will have an opportunity to visit finfish farms, hatcheries, processing facilities and research facilities in the St. Andrews area to gain valuable insight into the Atlantic Canada aquaculture industry. This is just one example of industry information sharing that will happen this year. In August, during

AquaNor (August 11-20), ACOA will host a Canadian aquaculture delegation to areas around Trondheim and Bergen. This will include a visit to AquaNor and visits to aquaculture producers, suppliers and researchers.

The Norwegian Trade Council (NTC) is a quasi-government organization with a mandate to promote Norwegian trade and industry internationally in order to strengthen the business environment in Norway and to create strong international partnerships. With close to 40 offices around the world, The Norwegian Trade Council is in a position to provide Norwegian exporters with hands on market knowledge and vital door opening services. The NTC is actively involved in promoting the Norwegian aquaculture industry worldwide, including in Canada. Continued initiatives and cooperation between Norwegian and Canadian aquaculture players ensure a long and profitable relationship between the two countries.

For further information about the NTC coordinated seminar taking place June 11, 2003 in St. Andrews, New Brunswick, please contact Lori Woloshyn at lori.woloshyn@ntc.no



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Animated discussions were the hallmark of NAIA's successful tradeshow. Here, NAIA's Mike Rose lends an attentive ear to Les O'Reilly, President, Marine Institute.

NAIA's 2003 conference, trade show major success

Cold wind and snow in mid-March did not stop the nearly 200 delegates and exhibitors from thoroughly enjoying NAIA's 10th Annual Conference and Trade Show held at the Albatross Hotel in Gander.

The cold weather definitely didn't prevent trade show exhibitors from showcasing their products and services. Indeed, all reports indicate very good networking opportunities occurred on the trade show floor. Twenty-two exhibitors representing industry, government, academia, suppliers and support services filled the large upstairs salon with a variety of products, handouts, information packages and prizes for the conference onlookers.

The trade show took on a different feel at this year's event. This year the opening reception and nutrition breaks

were held directly on the trade show floor. That purposely allowed delegates ample opportunity to visit the booths and network directly and often with exhibitors. Exhibitors acknowledged that this year's setup was a unique experience. Terry Fleet, representing the Department of Fisheries and Oceans exhibit said, "The opening reception was an excellent opportunity to network with conference delegates. As a regulator, I had the opportunity to talk with people during the coffee breaks while participating in the conference sessions as well."

NAIA's trade show coordinator Brian Power was pleased with the turnout at this year's event. "We were delighted

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Exhibitors congratulated on a tremendous show

From page 14

with the participation at this year's show. Plus, we appreciate the continued involvement from our loyal exhibitors and we were quite excited to welcome new faces and organizations." Power is most optimistic about what this change of style might mean for future trade shows. "The word is getting out about the success of our trade show and conference. Or, should I say conference and trade show! I have talked with exhibitors and delegates alike who were obviously pleased this year, so it will be very important for us to ensure their positive attitudes are reinforced in 2004."

What can potential exhibitors expect in 2004? NAIA is

taking a proactive approach by continuing to gather feedback from exhibitors in an effort to improve next year's show. "We are contacting this year's exhibitors and asking for constructive feedback," Power says. "There are a few points we discussed at the post-conference meetings. For example, we would like to expand the suppliers showcase. That was informative and fun. It gave all exhibitors a chance to pitch their services directly to delegates." The suppliers' showcase allowed exhibitors to give their "elevator pitch" to delegates for a strictly enforced two minutes to promote their product-lines or services.

NAIA extends thanks to the management and staff at the Albatross Hotel for their hard work during the Conference and Trade Show. "The layout was well received by participants and that is a credit to the hotel personnel," says Power. "I would also like to congratulate exhibitors on a tremendous show because, without a doubt, their involvement was paramount to the success of this year's event." For further information or inquiries about 2004, Brian Power can be reached at (709) 754-2854 or bpower@naia.nf.net.



Cecil Mitchell, Rainbow Net & Rigging, delivers his two-minute elevator pitch to delegates at NAIA's Cold Harvest 2003.

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From left to right, Jonathon Moir receives the Aquaculturist of the Year Award from the Hon. Yvonne Jones, Minister of Fisheries and Aquaculture and Garry Hartle, NAIA President.
Photo courtesy of Mac Campbell

Jonathon Moir selected NAIA's Aquaculturist of the Year

Jonathon Moir, president of Northern Aquaculture Corporation, was recently selected as NAIA's Aquaculturist of the Year. He is very well-known and respected for his influential and pioneering work in the development of the cod aquaculture sector in the province.

Each year NAIA identifies an individual for outstanding contribution to the industry association or in the development of the aquaculture sector in our province, and names him or her "Aquaculturist of the Year." This award recognizes significant achievements or accomplishments realized over a long period of time, in keeping with NAIA's primary objective to promote, assist and foster the development of commercial aquaculture activities in the province.

During his first employment in the industry, at the Canadian Centre for Fisheries Innovation Development, Moir helped develop a fledgling cod grow-out program. That

work centred on commercial fishermen and was aided by the Sea Forest Plantation company in St. John's. After the ban on commercial cod fishing in the early 1990s, Moir was instrumental in getting training in cod husbandry for some 400 commercial fishermen. Furthermore, he went on to help build a hatchery for cod aquaculture in an effort to assure the future of the industry. After a very unfortunate hatchery fire, Moir persisted and was able to raise capital and form partnerships to develop a cod broodstock using a separate hatchery in Winterton, Trinity Bay. In large part, the cod industry has continued from there in no small way due to his personal determination. He is currently closely associated with the commercial cod hatchery in Bay Roberts. Moreover, Moir has been actively involve with NAIA since it was formed in the early 1990s, and, in fact, he was NAIA president for three years.

In defence of Atlantic Salmon Aquaculture

From page 6

documenting the shifts in ocean temperatures and the unknown affects that's having on our oceans. Aquaculture is the new, highly visible industry that's come along and has been a convenient whipping post. Unfortunately, and to our detriment, we, as an industry, have been far too reticent to stand up and passionately defend ourselves.

Again, it must be emphasized that aquaculture is not the root cause of, or even a major contributor, to the current state of wild Atlantic salmon. Mismanaged capture fisheries and habitat destruction, in freshwater and saltwater, through a multitude of human sins over many, many years are the real cause. Our industry, where it does have the potential for impact in the future, will address the issues head-on. This is a great industry for Canada. The only future genetic reserve for Atlantic salmon may well be in Aquaculture.

Think about that!

In closing I'd like to report on an article in last Saturday's National Post. Elizabeth Nickson attended an anti-aquaculture meeting on Saltspring Island, B.C. and wrote an article entitled, "*An enlightening lesson in social justice.*" The gist of the article is that in the midst of a hostile meeting facilitated by Lynn Hunter of the Suzuki Foundation, which listed the evils of fish farming all over the world, two brave people got up to speak passionately and emotionally on behalf of our industry. A gentleman who had worked in the industry for over 20 years stated that in his 20 years, "*there's no pollution, no escapes, no filth...and the film they presented was filled with errors and misinformation. The best fishing in the gulf can be found off my fish farm....*" The other speaker, a younger woman, went on to say, "*I work for the biggest multinational fish farm in the province and every employee is BC-born-and-bred, they love the coast, they work to preserve it, and every problem you cite we have found or are finding solutions for.*" Now that took guts. According to Ms. Nickson, Lynn Hunter "visibly shrunk." There's social justice. Those of us who believe in this industry must summon the courage to tackle the critics. To speak up armed with our knowledge, experience and passion.

NOTICE: NAIA Members



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Navigable Waters Protection Act (NWPA) approval renewals

NAIA reminds its members that NWPA Approvals are valid for five years.

NAIA members whose NWPA Approval was issued in 1998 are advised to call Coast Guard 709-772-2284 to seek a renewal.

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GOING BEYOND YOUR EXPECTATIONS!!!

Dr. C. Young Cho delivers his acceptance speech on Parliament Hill after receiving CAIA's 2003 Herb Dhaliwal Sustainable Aquaculture Award.



Award presented to prominent scientist, educator

The Canadian Aquaculture Industry Alliance (CAIA) recently announced the second annual Herb Dhaliwal Sustainable Aquaculture Award has been presented to Dr. C. Young Cho, Adjunct Professor of the Department of Animal Science at the University of Guelph, and Research Scientist with the Ontario Ministry of Natural Resources. Dr. Cho was one of four finalists from across Canada being considered for the award.

The Minister of Natural Resources, the Honourable Herb Dhaliwal noted that Dr. Cho has been a pioneer and practical advisor to the aquaculture feed industry since the late 1970s and has been a leader in low-pollution diet development. "As one of the first-generation group of International Fish Nutritionists, Dr. Cho's initiatives have played a pivotal role in working toward the environmentally-sustainable development of the aquaculture industry."

CAIA President, Nell Halse stated that the Canadian aquaculture industry is proud of its innovative business leaders but also of scientists like Dr. Cho. "His commitment to excellence in science and research, coupled with a drive towards sustainable development of an industry that has tremendous potential for Canada's coastal and rural communities, has been and continues to be an excellent model for the many prominent researchers in fish-related fields who apprenticed with Dr. Cho, and for the many young men and women who are building careers in this industry."

While the aquaculture industry in Canada is still a relatively new one, its positive contribution to the agrifood sector continues to be acknowledged. The most recent figures available from Statistics Canada confirm the industry-generated revenues of \$674.1 million in 2000, compared with \$621.4 million in 1999 – an 8.5 per cent increase. Finfish, mostly salmon, accounted for 90 per cent of total sales, while mollusks accounted for 8.0 per cent. Though aquaculture industries are most commonly associated with regions of Canada's coasts, all provinces and one territory contributed to that production.

Production continues to grow in line with rising consump-

tion of seafood products. The Department of Fisheries and Oceans reported earlier this month that Canada's exports of fish and seafood products – including those produced in the aquaculture sector – reached an all-time high of \$4.7 billion in 2002, an increase of over 10 per cent from 2001.



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NAIA President's Page

GARRY HARTLE

This edition will be published at a time when the industry is facing major problems. The rise in the Canadian dollar (versus the US\$) has eroded profits for growers and processors. Concern for personal safety has resulted in a significant decline in the numbers travelling for leisure purposes. Restaurant revenues continue to drop. Chilean dumping continues to impact our traditional export markets. In particular, our mussel sector is in a crisis because processors are losing large sales due to deeply discounted prices being thrown into the marketplace. Among other things, this market disruption means an immediate loss of jobs and an inability to conduct optimal harvesting. Mussels, like time and tides, cannot wait for these man-made problems to be solved serendipitously.

Economical problems are not the only ones we face. There are other major industry-wide hurdles, such as:

- *Access to adequate, timely and reasonable cost-working capital;*
- *Rising regulatory barriers to growth;*
- *Environmental activism based on the propaganda of faulty science;*
- *Public perception about our industry; and*
- *Jurisdictional concerns (local, provincial, federal) as they relate to control, as when it is unclear whose call it is, then is usual for one level to duck or defer funding, support or decision-making to the others.*

NAI A is aware of our members concerns. The staff, the Board, our Executive Director and I are committed to doing everything possible to ensure the economic well-being of the industry and each of its members.



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CANADIAN COLD WATER AQUACULTURE FOOD PRODUCTION

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BY DAVID RIDEOUT
Executive Director,
Canadian Aquaculture
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As Executive Director of CAIA, I travel quite frequently and consequently search for ways to contribute on the home front to make up for my frequent absences. One thing that I do quite regularly is the grocery shopping. I am not telling you this to impress you with my domestic abilities or family skills development, but rather to explain that such activities keep me grounded with my family and my industry.

While shopping this week I was again struck by the vast array and quantity of products available for the consumer. This is a direct result of the efforts of food production systems like aquaculture. In observing the consumer shopping experience I could not escape the fact that our food production system works so well; meets consumer demands, provides a safe product and is affordable. I know some would question the latter point, but when you look at the efficiencies of our food production systems there is clearly reasonable costs for most products.

The Canadian aquaculture industry faces a constant challenge of consistently producing high quality, safe and environmentally safe products and we all know that it successfully accomplishes this task. As production systems become more sophisticated, there will be a constant requirement to be efficient so as to provide a Canadian competitive edge. It is increasingly difficult to preserve that competitive edge given that one of our obstacles is the establishment of a level playing field. Instead of operating on a level playing field, we (and our wild fish colleagues) must compete with other protein products that receive any number of advantages from crop insurance, animal health programming and bailouts, to direct subsidization. One only need look at the U.S. Farm Bill to see the overall government largess related to our competitors.

Similarly, we face situations where the wild stocks can no longer withstand the heavy pressure that is exerted on

them. Technology has outpaced nature and such things as the listing of Atlantic cod as endangered, or the *Nature* article on over-exploitation of the higher trophic-level fish, points to the need for another government social assistance program. I do not doubt that assistance programming is necessary but I also believe that with respect to finfish and shellfish, we can grow the animals necessary to meet the increasing market demand for Canadian Cold Water products.

In this environment we must ensure our industry establishes and maintains a competitive edge. We can expect increased pressure at all food-producing levels respecting

← Please see page 21

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Efficient food production systems like aquaculture offer a vast array of healthy food choices for consumers. It is critical to ensure high food safety, quality, and environmental standards are strictly enforced as the Canadian aquaculture industry expands.

Industry must establish, maintain competitive edge

From page 20

food safety, due diligence, traceability and environmental sustainability. Failure to strike a proper balance that allows appropriate time for ingenuity and for innovation will mean increased pressure on government to regulate and increased pressures on farmers to respond. The net result will be increased costs for consumers. We cannot lose focus on the fact that we have one of the best and safest food production systems in the world and we must do everything we can to ensure it stays that way. The next 18 months will be critical for our industry and for Newfoundland – hopefully our expertise will be part of the solution.



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Since Sweeney International Management Corporation (SIM Corp.) first opened their doors for business in January 2002, company president, Bob Sweeney says that he has been very pleased with the welcomed reception that his company has received from Atlantic aquaculturalists and government agencies.

Based in St. Andrews, NB, SIM Corp.'s business plan was based on the ever-growing demand for professional management services on a short-and long-term basis. Sweeney, a former employee of the New Brunswick's Department of Agriculture, Fisheries and Aquaculture, and Department of Natural Resources, says that his experience in developing and executing governmental regulatory requirements and codes of practice is a real advantage that he offers to his customers.

While SIM Corp. has completed several projects at an industry-wide level, Sweeney says his firm is most frequently contracted to perform client-specific management services. These services include project development and management, compliance strategies and implementation plans and administrative services to individuals and producers' buyers groups, to name a few.

Among the list of environmental management services that SIM Corp. offers is development of industry waste management plan templates. For example, in 2003, the New Brunswick Department of Environment and Local Government began issuing Approvals to Operate to marine aquaculture sites in the Bay of Fundy. In response to the department's action, SIM Corp. designed a template waste management plan that could be customized to specific sites or used at an industry-wide level. Sweeney says that the waste management plan template, which includes all approved disposal methods for industrial marine debris, moribund fish and offal, blood and stun water and human sewage, was used by over 12 growers in the Bay of Fundy. Sweeney says that his staff had one goal in mind throughout the creation of the waste management template, "We wanted to make sure that each grower and their crew fully understood the plan and were comfortable with the guidelines." Sweeney

believes that the only way to minimize a site's environmental impact on the marine environment is to ensure that site crews are well educated on ways to minimize those risks and perform frequent follow-ups to make sure that crews continue to follow those rules.

Although New Brunswick has been an aquaculture pioneer, Sweeney says there are still many challenges that the province's 17-year-old industry faces.

Recently, many New Brunswick companies have devoted much time and financial resources to species diversification, as well as marketing and value-added projects. Although their efforts indicate the growers are preparing for industry growth, Sweeney says that many governmental roadblocks exist that hamper growth. He explained, "A lot of farmers are facing tough challenges in the new site application process and in approvals for site boundary expansions." He added, "SIM Corp. works one-on-one with growers to find solutions to challenges in everything from the application process to site boundary expansions. We've also had the opportunity to assist farmers with their applications for species diversification as well as marketing and value-added plans. It's really exciting to work with growers on those projects to see an idea from conception to the end-product."

SIM Corp. has positioned itself among New Brunswick aquaculturalists, both finfish and shellfish, as a key player in the industry's short-and long-term management strategies. Sweeney says his company has worked very hard over the past year to identify the strengths and the weaknesses of New Brunswick's aquaculture industry. Furthermore, he said that SIM Corp. plans to continue working with industry and government to bring about change and resolutions to some of the industry's most pressing issues.

Sweeney confidently provides an answer to why he believes his company has been so successful. He says that the company's success is a result of dedication to its mission statement: "*To provide a range of services to both finfish and shellfish producers to ensure that growers can maximize their time and energies as they cultivate and bring to market their aquaculture products in the most efficient and cost-effective manner possible.*"

Going deep – To manage super-chill

BY GEOFF PERRY

The winter of 2002/03 will not be one that farmers on the east coast will look back on with fondness. Lethal water temperatures and ice driven by wind, waves, and currents killed large numbers of fish and destroyed cages and equipment in Nova Scotia, New Brunswick, and Maine. Somewhat surprisingly, Newfoundland farmers largely escaped the effects of one of the coldest, harshest winters in recent memory.

What makes this even more surprising, is that in the search for sites in the early days of salmonid aquaculture in Newfoundland, no sites outside of Bay d'Espoir and few sites outside of Roti Bay (inside Bay d'Espoir) were found with winter thermal regimes suitable for overwintering fish. Most sites had lethal overwintering temperatures lower than -0.7°C at least in the top two-to-four metres of the water column. It seemed that Atlantic salmon and steelhead trout culture would be limited by the capacity of sites in Roti Bay to assimilate organic wastes.

In fact, the industry is poised for expansion. Many of the husbandry challenges of the winter marine conditions and the dynamics of the estuarine-fjord water column of Bay d'Espoir have been addressed. Given that some high-value markets demand large fish, maintaining inventories through at least one winter will be necessary and identification of production and overwintering sites within and outside Bay d'Espoir remains key for continued growth.

Farmers have observed differences in livestock behaviour related to changes in weather and water quality and infer that healthy fish tend to choose a position in the water column that avoids physiologically difficult conditions related to water temperature and salinity. If this interpretation is correct, a key question in the development of new sites is, if given sufficient net depth, will salmon and trout avoid lethal temperatures? If so, the south coast of Newfoundland holds significant potential for salmonid farming.

During the winter of 2001/02, government departments and salmonid growers conducted an experiment to evaluate salmon and steelhead survival in 10m-versus 25m-deep nets at a high-current site in The Matchums area of Little Passage, Bay d'Espoir. Cages were instrumented with current, salinity and temperature measuring equipment. Fish were tagged with data storage tags and physical examinations were made of all mortalities; blood chemistry was measured, and tissue samples were collected for histological examination.

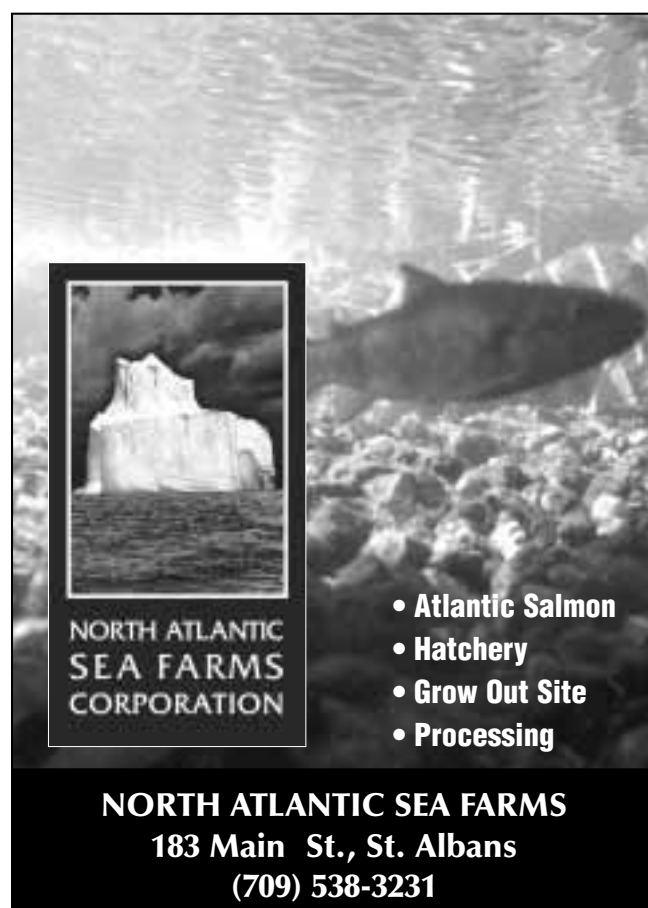
The results showed that salmon and trout in 10m-deep nets are 1.7 and 1.5 times, respectively, more likely to die during the winter than fish in 25m-deep nets. Somewhat unexpectedly, irrespective of temperature, the records from data storage tags reveal that both species tended to remain in the 2-4m wedge of the water column even though both species avoided sub-zero temperatures. Maximum depth observed by divers for most of the fish in each cage did not exceed 14m though tagging data indicated that some did make trips down to 23m depths. This observation also matches well with the observa-

tions of farm workers who noted that in the 25m-deep, nets salmon spent half their time at depths between 10 and 12m while trout were positioned a little shallower. In contrast, farm staff observed that salmon and trout in the 10m-deep nets spent half their time at depths between 6 and 8m. Some of this behaviour, particularly in the deeper nets, was also likely a response to the effect of current conditions at the site that were seen to cause considerable billowing of the nets.

For steelhead, highest mortality was observed among second-year fish. Post-mortem examinations revealed that 19 of the 20 fish sampled were maturing and exhibited symptoms of osmo-regulatory distress. This result is in marked contrast to the less than 10% incidence of maturation at harvest as observed at the processing plant. Although not the focus of this research, the results suggest that maturing steelhead are not able to survive the maturation process if coupled with physiological stressors. These stressors may be directly related to hormone changes related to maturation or the fact that, in the wild, maturing steelhead would be returning to freshwater.

The results also suggested that use of nets much greater than 10m depth may not be economically justifiable for overwintering first-year salmonids as the fish did not generally use the extra space and the extra cost of netting may be avoidable.

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Dr. Whelan conducts site visit to assist industry for being an aquaculture veterinarian. develop better husbandry practices ... the reason

Now is the time to invest in Newfoundland and Labrador Aquaculture

BY DR. DARYL WHELAN

The time for Investment in Aquaculture in Newfoundland and Labrador is now. From a Fish Health standpoint producers, government and Academia are working towards a common goal. Maximize production through good fish health practices and utilize a policy framework that enables that goal. The strength of **our** Industry comes from innovative, intelligent producers and their ability to persist through the dark days of the past.

The new hope for the industry is inspired by the protocols initiated in the aquaculture sector. Husbandry and bio-security measures were tightened, new strains were accessed, stock transport was refined, and stock health is at an all-time high. Producers are investing in their employees and in their operations. Interest from other jurisdictions is apparent. The message to convey to investors is that Newfoundland and Labrador is following sound health and business practices.

Documents that really mean something are at various stages of evolution. The Newfoundland and Labrador Management plan, a doctrine based on health, performance



Another setting familiar to Dr. Whelan is guest lecturing at scientific forums. Here, Dr. Joe Brown looks on at a cod research forum recently held in St. John's.

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Cluster initiative facilitating ocean technology development

BY DENNIS HOGAN
DEVELOPMENT EXECUTIVE,
OCEANS ADVANCE

Ocean technology development in Newfoundland and Labrador has reached new heights with the formation in 2002 of a world-class innovation cluster. Dubbed *Oceans Advance*, the ocean technology cluster is a major initiative of the National Research Council (NRC) and a broad range of industry, research and development and government stakeholders.

The world ocean sector is worth approximately \$1.5 trillion Cdn. annually and Newfoundland and Labrador, and the St. John's region in particular, has a tremendous opportunity to take advantage of this large international market. The province's historical and cultural attachment to the sea, strategic geographic location in the North Atlantic, and the fact that over 90 per cent of its population lives near the sea, make an ocean technology cluster a natural development. For the last several decades federal and provincial governments have targeted the St. John's area for investment in Research and Development infrastructure, thus academic and technical expertise has expanded, and a strong entrepreneurial spirit has flourished. All of these factors have helped shape the ocean technology sector and positioned it for a new level of global competitiveness.

According to NRC President, Dr. Arthur Carty, clustering describes the growth of a significant concentration of innovative companies around a nucleus of research and development facilities,

such as those provided by a university or a leading-edge government laboratory. Fueled by innovation, the cluster becomes a hotbed of technology-transfer and investment. In this respect, the province is well placed to capitalize on its strength in ocean-related endeavours.

Spanning many facets of ocean technology, including remote-sensing and navigation, marine communications and electronics, cold ocean engineering, and aquaculture, the cluster is an organized effort to leverage long-term economic growth from our excellent resources and capability. For example, in collaboration with the aquaculture industry, the NRC's Institute for Marine Dynamics (IMD) has worked on measuring and predicting environmental loads on salmon cages and shellfish long-line installations. This has included model tests of a proposed salmon cage, full-scale measurements on a salmon farm in the Bay of Fundy, and numerical models of shellfish long-lines. As part of the cluster initiative, Oceans Advance is developing a matrix to bind all such capabilities and efforts together to leverage even greater research and development success in the future.

Major pillars of cluster activity include community integration, expansion of NRC research and development, and the establishment of an ocean technology incubator at the IMD in St. John's.

Led by the private sector with support from government and other stakeholders, Oceans Advance is facilitating industry collaboration that will allow like-minded firms – even competitors – to form alliances and combine capabilities to accomplish business objectives.

More specifically, Oceans Advance assists with networking, international marketing, identifying business opportunities, and branding of the ocean technology cluster worldwide. In partnership with the City of St. John's, Oceans Advance has recently launched

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Here members of industry eagerly listen as Dr. Whelan leads a discussion on fish health research.

We are a culture that understands the sea

From page 24

and a good neighbour policy is an intrinsic part. The Code of Containment and Code of Practice prove out the responsibility that producers display on a daily basis. All of these documents will ensure a solid base for investment and expansion in aquaculture.

Is it any wonder that Newfoundland and Labrador is an attractive place to build an aquaculture enterprise???

Bottom line is that all Newfoundland and Labrador communities benefit when a viable, sustainable industry is introduced. We are a culture that understands the sea. We are born to it ... and even those that leave the province, wish to come home. Aquaculture can offer that opportunity.

The examples from other provinces and countries cannot be forgotten. There will always be disease issues to overcome in the aquaculture industry. Do not forget that as humans we deal with health afflictions on a daily basis. Disease is stubborn and at times incurable. It is human nature to diminish or forget past lessons. We must stay vigilant for health issues in Newfoundland and Labrador. Veterinarians are the first line of defense and will coordinate disease management in conjunction with the producer.

Fortunately, a close relationship between provincial producers and the veterinarian is established. Previous provincial veterinarians have ensured a solid foundation for health to build. Drs Joanne Constantine, Leighanne Hawkins and Larry Hammell have to be commended for the dedication shown to the local salmonid sector. This bond enables a

valid Veterinary Client Patient Relationship (VCPR), allowing a veterinarian to diagnose, manage or treat a disease at the aquaculture site. Of course, veterinarians are governed by varying levels of oversight:

- Personal ethics
- The Veterinarian's Oath
- Newfoundland and Labrador Veterinary Medical Association
- Newfoundland and Labrador Veterinary Licensing Board
- The Newfoundland and Labrador Veterinary Act
- The Newfoundland and Labrador Aquaculture Act
- Eastern Aquaculture Veterinary Association
- Canadian Veterinary Medical Association

A VCPR is crucial and required in order to provide ambulatory service to a cage site, hatchery or research facility. The Department of Fisheries and Aquaculture has made commitments to support the Veterinary Aquaculture Health Unit and to ensure required veterinary service to aquaculture locations. One individual has been instrumental in securing veterinary services for the industry and that is Brian Meaney, assistant deputy minister, in fisheries and aquaculture.

If any individual requires any further fish health information, contact Dr. Daryl Whelan at the Department of Fisheries and Aquaculture.

COUTURIER ON CULTURE

A historical perspective on aquaculture development and commercialization

BY CYR COUTURIER
MARINE INSTITUTE OF
MEMORIAL UNIVERSITY



R & D Funding and Need for Coordination

There are a variety of funding groups and agencies across the country with at least part of their mandate devoted to aquaculture Research and Development. I emphasize the “R” in that most of the criteria for accessing the funding are geared towards this component of the research to commercialization continuum. For example, a partial listing of agencies and programs that spends at least part of their budgets or somehow provides access (direct and indirect) in some way to R and D funds includes: the Canadian Customs and Revenue Agency, the National Research Council of Canada (core and Industrial Research Assistance Programs), the Atlantic Innovation Fund, the Natural Sciences and Engineering Research Council of Canada, the Department of Fisheries and Oceans Canada (core and ACRDP programs), various provincial governments, Industry Canada, AquaNet, the Canadian Centre for Fisheries Innovation, BC Science Council, Atlantic Canada Opportunities Agency (via administration of federal funds for R and D), and of course the industry itself. And, there are likely many more avenues for R and D funding in this country.

One of the industry’s main concerns in all of this is that there appears to be substantial expenditures of taxpayers dollars, but on the surface there is little coordination or strategic approach to using these resources. In fact, the Canadian Council of Fisheries and Aquaculture Ministers has dedicated a task group to examine this specific question of R and D coordination and provide recommendations to both levels of government on possible solutions. A workshop led by DFO Science and involving a handful of the major funding/granting agencies involved with aquaculture was held in Montreal in early March and a report from the organizers is expected soon with recommendations on who should lead the initiative, where, how, and when.

Another major concern of industry has been that while there appears to be ample support for aquaculture research, albeit perhaps, not as coordinated or strategic as desired, there is arguably little public/private funding for actual aquaculture Development in Canada. Unlike a number of other economic sectors important to the Canadian economy, aquaculture has not been the subject of a national strategic development approach. A national workshop and working group on “Research to Commercialization,” was convened slightly more than a month ago in Ottawa in late March by the

Canadian Aquaculture Industry Alliance (CAIA), with logistic support provided by DFO ACRDP. Leading industry experts were invited to present case studies on the research, development and commercialization continuum, and a number of recommendations were made for moving ahead on this issue. CAIA will provide a report on this initiative in the near future.

As part of the working group I provided a historical perspective and some comments on Canadian aquaculture development and commercialization. The following summarizes that perspective.

The Research, Development and Commercialization Continuum

Research, development and Commercialization are essential components and steps for the success of *any* industry, including aquaculture. There is no clear separation among these three primary components, and they exist along a con-

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Aquaculture in the Coast of Bays

The natural way to do business

BY BROOKS B. PILGRIM
COAST OF BAYS CORPORATION

The aquaculture industry in the Coast of Bays region has continually grown since its inception. It is commonly referred to as the aquaculture capital of Newfoundland and Labrador with good reason. All four of the species identified in the provincial strategic plan – mussels, rainbow trout, Atlantic salmon and cod are all commercially grown here.

As a result of its unique coastline, the south coast of Newfoundland is perhaps one of the most ideal locations for aquaculture in Atlantic Canada. The Coast of Bays region is composed of 1,365km of numerous sheltered bays and fjords, crystal-clear water and is free of pack ice, making it ideal for finfish and shellfish aquaculture.

The region also has the warmest marine water temperatures in the province. With these excellent aquatic conditions, the Coast of Bays offers tremendous opportunities for investors, entrepreneurs and innovators.

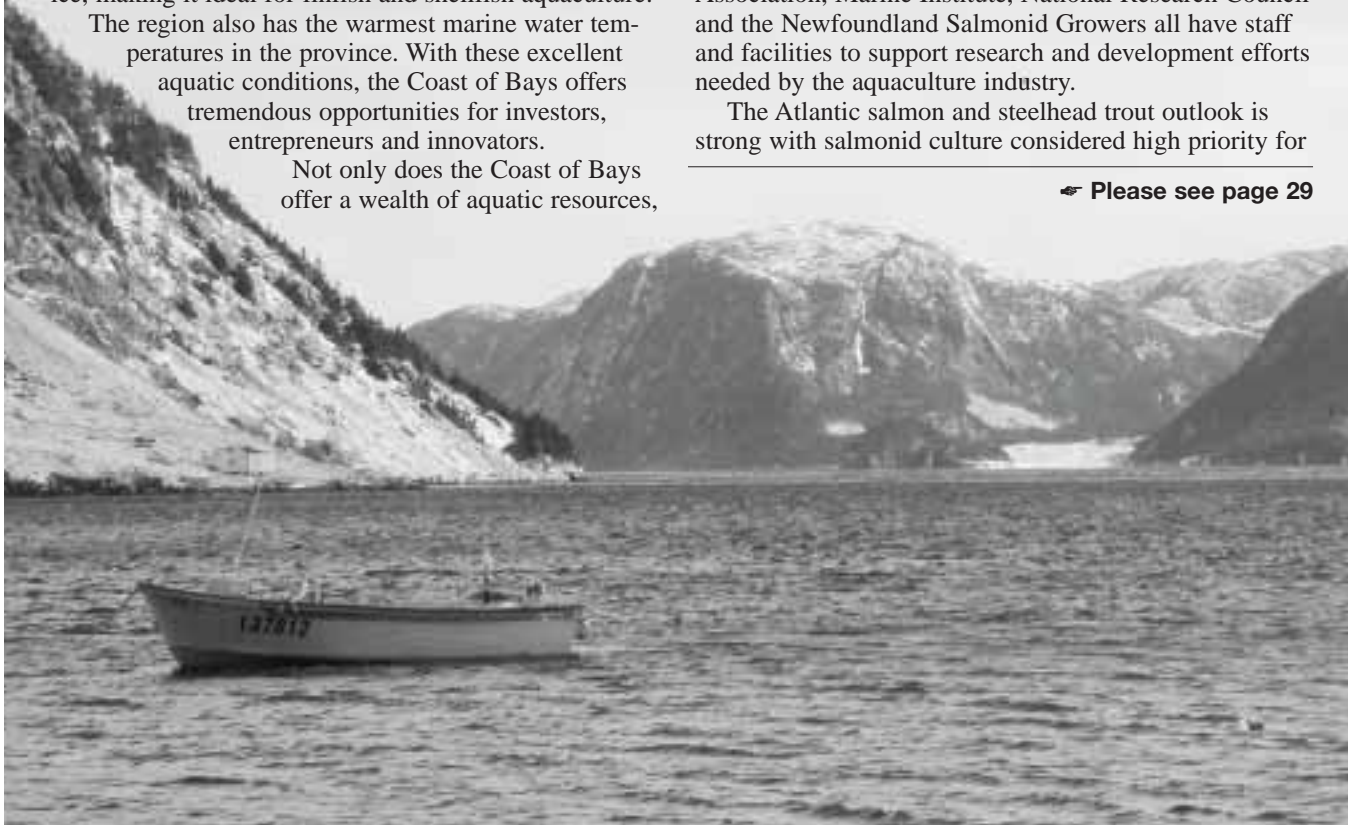
Not only does the Coast of Bays offer a wealth of aquatic resources,

but its strategic location also gives an advantage to trade routes with Europe, the United States and Asia. Infrastructure for the industry is excellent with many suppliers and services locally available. Our superior environmental conditions, availability of expertise and strong support services make the region ideal for continual growth in this sector.

Research and development is essential to the aquaculture industry in the development of new species and for continuing improvements in reducing costs and issuing efficiencies in existing species. Local infrastructure and research is steadily improving in support of the industry. The Department of Fisheries and Aquaculture has a fish health laboratory in St. Alban's. As well, the Coast of Bays Corporation, Newfoundland Aquaculture Industry Association, Marine Institute, National Research Council and the Newfoundland Salmonid Growers all have staff and facilities to support research and development efforts needed by the aquaculture industry.

The Atlantic salmon and steelhead trout outlook is strong with salmonid culture considered high priority for

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The hills surrounding Harbour Breton portray the kind of coastline one finds along the province's south coast.



Inshore fisherman turned aquaculturist Jim Fudge steadily plies the waters of majestic Hermitage Bay with passengers Jennifer Caines (North Atlantic SeaFarms), Geoff Perry (DFO), and Paul Strickland (ACOA).

Excellent venue for world leadership in aquaculture production

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commercial development in the province. Steelhead trout and salmon production is estimated to make a dramatic increase over the next four years. This is evident through the heightened interest in new site applications all over the region with expansion slated for Fortune Bay (to the east) and for McCallum (to the west) along the south coast.

Cod aquaculture has seen significant interest and investment with infrastructure being developed to support this new sector in the region. The production of sufficient numbers of hatchery juveniles for sea-cage grow-out will be facilitated with the development of the cod hatchery in Bay Roberts. As well, the former scallop hatchery in Belleoram is being converted into a cod nursery for early development and growth of cod fry. Cod aquaculture has seen positive market developments, significant biological advances and a strong commitment from the private sector.

The mussel industry in the region is still growing and

shows promise of increased production and full-scale commercial integration (growing, processing and marketing) over the next few years. The industry has great potential for long-term profitable growth, especially with the development of secondary production options that will increase market opportunities. For the past several years intensive studies have been conducted in the area by the Marine Institute and the Newfoundland Aquaculture Industry Association to determine mussel biology/behaviour and culture techniques that work best for mussel farming in the region.

The continuing growth and impact of the aquaculture industry to the economy in the zone is significant, with expansion predicted in all sectors. With rich resources, knowledgeable and efficient workers, strong commitment to quality, infrastructure, research and strategic location for access to world markets, the Coast of Bays offers investors an excellent venue for world leadership in aquaculture production and industry development. Aquaculture in the Coast of Bays is without question the natural way to do business.

Overview of Canadian aquaculture

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tinuum, ranging from basic and applied research to full commercialization. There are a number of key features about this R to C continuum worth noting, with historical examples given in the next section:

The duration of each phase (research, development, or commercialization) varies somewhat depending on species or sector and the associated constraints, however, it generally decreases along the continuum.

Each phase is interdependent on the others, and not mutually exclusive. That is, research depends on development and commercialization outcomes, and commercialization depends on R and D.

There is an ongoing "R and D" component even after commercialization. This is needed to remain competitive and/or to solve constraints. Thus, once a commercial stage is reached, industry needs to continuously improve in a variety of manners to remain competitive.

The level of *risk*, whether financial, technical or otherwise, diminishes as commercialization is approached. It can be argued that the higher the risk, the greater need for public support in terms of funding and financing, particularly.

Financially, the *cost* increases along the continuum, with research requiring relatively small amounts of money compared to development/pre-commercialization, and compared to commercialization. Examples from Canadian aquaculture or other industries show that a \$1 million research effort, generally means at least \$4-5 million in development/pre-commercialization, followed by another \$5-10 million in commercial financing, which in turn has the potential to contribute \$10 million or more annually to the Canadian economy.

Historical Overview of Canadian Aquaculture R, D, and C

Recent Canadian aquaculture production statistics showed major increases in growth in any given species group, even exponential, once a threshold of about 3,000-5,000 tonnes was reached. These are essentially the same patterns observed over and over again in highly successful culture industries elsewhere, including the New Zealand Greenshell® mussel industry in the late 1980s, the Norwegian Atlantic salmon industry in the 1970s, and more recently, the Chilean salmon and mussel industries in the 1990s. There are several reasons for these major industry growth patterns following a minimum threshold but the principal ones are: 1) sufficient technical competency attained for commercial production, including consistent production; 2) private investor confidence in commercialization; and 3) clear market presence. In fact, these three elements are no different than any other industry, whether involved with food production or otherwise. So, now, let's turn to the Canadian examples.

The *research* phase of the continuum for Canadian salmon and mussels occurred over approximately a 10-15- year span from the 1960s to the late 1970s. Since this was research it

was considered high risk, and therefore conducted primarily by the public sector – the Fisheries Research Board of Canada and DFO Science in the case for salmonids on both coasts, and by provincial governments/university partnerships in the case of blue mussels in Atlantic Canada.

The next phase, development and precommercialization, took place over a 5-10-year period beginning in the late 1970s with salmon on both coasts and mussels on the east coast. For example, commercial salmon production only began rapid growth in the late 1980s after a 10-year-period of development where levels increased slowly to 5,000 by 1988 and increased rapidly to 70,000 tonnes a decade later in 1998. A similar pattern for blue mussels in PEI was seen where production in the early 1980s was barely 3,000 tonnes but a decade later had increased more than 500 per cent. Again, once the 3,000-5,000 tonnes level was reached during the development phase, each of these Canadian sectors entered a major growth period.

It is important to mention here that the *development* period was still considered high risk and therefore occurred principally via public-private partnerships (PPP). In fact, it can be argued that significant industry development and commercialization only took place in areas where public policy (mostly provincial) was supportive and development

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Funds needed to implement development

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“monies” were made available from the public sector. For example, the important mussel industry in PEI developed rapidly when there was public policy supporting site access, financing support in the form of loan guarantees was made available, market development assistance was provided, and ongoing technology transfer and farm extension programs were made available. Similarly, the New Brunswick salmon industry *development* phase saw public support for loan guarantees, seed capital, site access, technology transfer and ongoing farm extension programs.

The Canadian salmon and mussel industries in PEI, NB and BC essentially achieved commercialization stages in the early 1990s, characterized by private sector investment, market and industry growth. However, industry development does not stop there; once commercialization is achieved in an industry there is a need for ongoing R and D to further enhance production and remain competitive. Areas such as production technology and stock improvements, development of health and pest management tools, product diversification (including alternate species), and so on, need to be ongoing, thus providing a feedback to the continuum from Research to Commercialization. Current examples include the need for ongoing R and D to deal with invasive fouling organisms in the mussel sector and fish health management strategies in the finfish sector. Essentially this is a self-improvement model. Ongoing R and D particularly the development side of things, still has considerable risk, even for established, sustainable farming corporations. Therefore it can be argued that public support for PPPs is needed for the development, yet there are few, if any, targeted funds available for this at present.

One of the key features of the R to C continuum is the interdependence of each phase on the other; that is, research preceded development and precommercialization, which precede commercialization. Sounds intuitive, but one depends on the other and they are *all* linked by feedback mechanisms involving the need to continuously improve to remain competitive.

Some thoughts on Aquaculture Development Funds

As mentioned previously, there is a multitude of R and D funds currently in existence, each with their own criteria for access. However, it can be argued that most, if not all, are not focused nor are they targeted in a strategic manner to address industry constraints. In fact, there are few, if any, true *development* funds available to the Canadian aquaculture industry; those that do exist have caps that do not come close to addressing the needs.

Past experience has shown that in regions of Canada where public policy and initiatives in support (implementation) of aquaculture have *not been* supportive over several years, one way or the other, significant private investment has been made in *research* and development for unproven commercial technology/know-how. In these areas, govern-

ments encouraged development risk, yet have not shared the risk adequately. The net result is that the private sector has used up its equity and is not able to reach commercialization, owing to lack of investment or access to financing. We need only look at a couple of provinces where aquaculture has been slow in development, in spite of more than two decades of effort by the industry. However, in those regions of the country where governments were willing to share the risk of *development* and *commercialization*, vibrant and sustainable commercial finfish and shellfish culture sectors have evolved.

There is currently little in the way of targeted development funding for aquaculture. What exists is fragmented, unco-ordinated, and not strategic in nature. This is unlike our competitors who have mechanisms to fund aquaculture development as something that is of strategic importance to the economy. One need only look at the Norwegian or Chilean experience to understand what is meant by this. To my knowledge, there are no national strategic or even regional strategic plans supported fully by policy or public funding strategy.

Can we afford not to have public policy in support of aquaculture development? The answer would be one only needs to have a look at the lost opportunities already with respect to salmon, mussels, and other species. However, perhaps more importantly, any policy **must** be supported with funds to implement the *development* framework. There is a definite gap here that has impeded, or slowed progress in sustainable aquaculture development in the country.

How much money is needed?

This will depend on the objective, species, etc. However, we already know that relatively minor investment of public funds in PPPs for *development* have yielded significant economic opportunities already for aquaculture. We can cite as examples, the current salmon industry in New Brunswick or the mussel industry in PEI. More recent examples include the development of the cod seed supply system in Newfoundland and the halibut hatchery-nursery systems in Nova Scotia and New Brunswick.

Many of the industry participants at the workshop in Ottawa concluded that, among others things, federal-provincial agreements with development components, have played quite a major role in aquaculture development in the past. Examples were given of the ACERA agreement in Newfoundland and Labrador which for an annual PPP investment of \$4 million over five years, now generates \$25 million per year in farm sales and another \$25 million in indirect benefits. The Alternate Species federal-provincial agreement in the Maritimes which provided \$1 million Cda. per year in PPP funds over five years, kick-started the multimillion dollar halibut, scallop and haddock culture sectors. Current estimates are that \$7 million annual development investment over six years to commercialize the cod industry in Atlantic Canada will yield up to \$150 million in farm-gate sales and \$100 million in spinoffs in 7 years or so. Thus, relatively

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Perspective on aquaculture development

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minor public investment in development has and should yield relatively high returns to the Canadian economy.

And, why not invest in aquaculture development, from a public policy perspective? Models exist already for other Canadian industries that are based on technology, and that are both in the realm of renewable and non-renewable resources (e.g., oil and gas, agriculture, etc.). It would seem to me that sustainable food production from aquaculture is a natural fit for all Canadian governments.

Some ideas on funding aquaculture development:

A few suggestions for instruments to provide public *development funds* for aquaculture sharing risk via loan guarantees, as is available for other Canadian economic sectors:

- Establish targeted Federal / Provincial R and D funds, as occurred in the past
- Have a strong and vibrant tax credit system for R and D
- Sequestering mineral and non-renewable resource revenues for sustainable aquaculture development e.g., oil and gas, nickel, etc.
- Targeted human resource transitional funding for collapsing economic sectors avoid the TAGS “lesson.”

Importance of Extension and Technology Transfer:

Extension and technology transfer are *critical* for initial development and commercialization, but also for ongoing development of the industry. At present there is no overarching national, or in many cases even regional, strategy and commitment for Extension and Technology Transfer (ETT) for the aquaculture sector. There are clear examples of this in the past where ETT has greatly aided and advanced the industry. One of the challenges, however, is for enabler/regulatory agencies such as DFO or provincial fisheries departments to provide extension support unless clearly established in law/regulation. This has rarely worked effectively in our country but there are models out there such as the BIM component of the Ireland Department of Marine (BIM is legislated as extension and not regulatory) or the Federal-State-University Sea Grant model in the United States. More on this issue in future editions of the Cold Harvester.

Conclusions

The R to C continuum is integrated, interdependent, and can be as long as 20 years in the making. Public and private sectors need to realize this at the outset.

Public policy needs to be developed and enunciated on aquaculture development. Moreover, it needs financial support for implementation.

There is a need for a national targeted aquaculture *development* strategy, with regional implementation. Our competitors have them, so why not Canada?

The national strategy must include *risk sharing* by both public and private sectors, which includes commitment of public funds from provincial and federal sources.

The “return on investment” for public funding of aquaculture *development* can be relatively large and there are clear

examples of this already available. Thus, relatively small public investments can have been shown to yield substantial increases in GDP and sustainable economic activity.

Models already exist out there, e.g., Fundacion Chile, Norwegian counterpart, EU aquaculture strategic development funding, etc. There is no need to reinvent the wheel.

There is a need to consider a holistic approach and to address continuum, rather than phases only. Current approaches are piece-meal, i.e., R and D funds, or just R funds; no real D funds.

Note: The views and opinions expressed herein are my own, and no attempt should be made to ascribe them to any others.

Ocean technology

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an Ocean Technology Speaker Series, and is helping to coordinate the NRC’s ocean Information and Communication Technologies (ICT) technology transfer mission to Ireland.

As geographical clusters of technical, scientific and business acumen come together and grow, they become engines of wealth-creation for today’s knowledge-based economy. In this regard, the cluster is leading the drive toward collaboration among players in the ocean technology sector, improved information networks, increased access to finance, the fostering of entrepreneurs, and the support of industry champions.

Going deep

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Net depths of up to 15m depth may be useful for improving performance of second-year salmonids if maturation and other sources of stress can be identified and controlled. Controlling maturation likely requires a combination of husbandry refinements (e.g., breeding, photoperiod manipulation, diet and ration control, and sight current conditions).

Of equal importance to farmers is whether deeper nets convey any advantage to summer farm operations where farmers observe fish deeper in the water column, except when feeding. It is important to understand if this avoidance of the upper water column is related to elevated temperatures, light intensity or lower salinity.

Overall the results of this project confirm that deeper nets can be an effective tool to refine husbandry measures around physiologically difficult times of the year and that overwintering outside of Bay d’Espoir is an option farmers may choose if they know their site.

For the full report on this project see:

Pepper, V., A. Mansour, and D. Whelan. 2002. *Optimal net depth for over-wintering Bay d’Espoir aquaculture salmonids*. Aquaculture Collaborative Research and Development Program, Project NF-01-06-003. Department of Fisheries and Oceans. 45p.

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For more information contact: Mike Rose - Executive Director,
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