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REPORT OF PROCEEDINGS  
(HANSARD)

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SPECIAL COMMITTEE ON  
SUSTAINABLE AQUACULTURE

**Vancouver**  
**Friday, December 1, 2006**  
**Issue No. 31**

ROBIN AUSTIN, MLA, CHAIR

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**SPECIAL COMMITTEE ON  
SUSTAINABLE AQUACULTURE**

Vancouver  
Friday, December 1, 2006

- Chair:* \* Robin Austin (Skeena NDP)
- Deputy Chair:* \* Ron Cantelon (Nanaimo-Parksville L)
- Members:*
- \* Al Horning (Kelowna-Lake Country L)
  - Daniel Jarvis (North Vancouver-Seymour L)
  - \* John Yap (Richmond-Steveston L)
  - \* Gary Coons (North Coast NDP)
  - \* Scott Fraser (Alberni-Qualicum NDP)
  - \* Gregor Robertson (Vancouver-Fairview NDP)
  - \* Shane Simpson (Vancouver-Hastings NDP)
  - \* Claire Trevena (North Island NDP)

*\*denotes member present*

*Clerk:* Craig James

*Committee Staff:* Brant Felker (Committee Research Analyst)

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*Witnesses:*

- Dale Blackburn (B.C. Salmon Farmers Association)
- Keith Bullough (B.C. Salmon Farmers Association)
- Greg Deacon (B.C. Salmon Farmers Association)
- Ross Grierson (B.C. Salmon Farmers Association)
- Odd Grydeland (B.C. Salmon Farmers Association)
- Justin Henry (B.C. Salmon Farmers Association)
- Dr. Brad Hicks (B.C. Salmon Farmers Association)
- David Lane (Coastal Alliance for Aquaculture Reform)
- Chief Moses Martin (B.C. Salmon Farmers Association)
- Robert Mountain (Coastal Alliance for Aquaculture Reform)
- Dr. Craig Orr (Coastal Alliance for Aquaculture Reform)
- Jay Ritchlin (Coastal Alliance for Aquaculture Reform)
- Catherine Stewart (Coastal Alliance for Aquaculture Reform)
- Gerry Thorne (Coastal Alliance for Aquaculture Reform)
- Mary Ellen Walling (Executive Director, B.C. Salmon Farmers Association)



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J. Ritchlin	



MINUTES

# SPECIAL COMMITTEE ON SUSTAINABLE AQUACULTURE



Friday, December 1, 2006  
9:00 a.m.  
Strategy Room 420,  
Morris J. Wosk Centre for Dialogue,  
580 West Hastings Street, Vancouver, BC

**Present:** Robin Austin, MLA (Chair); Ron Cantelon, MLA (Deputy Chair); Gary Coons, MLA; Scott Fraser, MLA; Al Horning, MLA; Gregor Robertson, MLA; Shane Simpson, MLA; Claire Trevena, MLA; John Yap, MLA

**Unavoidably Absent:** Daniel Jarvis, MLA

**Others Present:** Brant Felker, Research Analyst

1. Opening statement by the Chair, Robin Austin, MLA
2. The following witnesses appeared before the Committee and answered questions:
  - 1) British Columbia Salmon Farmers Association
    - Mary Ellen Walling, Executive Director
    - Dr. Brad Hicks, Vice-President, Taplow Feeds
    - Odd Grydeland, Odd Grydeland Consulting, Division of Namsos Invest Ltd.
    - Justin Henry, Operations Manager, Target Marine Products LLP
    - Ross Grierson, President, EWOS Canada Ltd.
    - Dale Blackburn, General Manager of West Coast Production Activities, Marine Harvest Canada
    - Keith Bullough, Chief Executive Officer, Pan Fish Canada
    - Greg Deacon, Nutritionist and Sales Manager, Skretting Canada
    - Chief Moses Martin, Tla-o-qui-aht First Nations
  - 2) Coastal Alliance for Aquaculture Reform
    - Catherine Stewart, Campaign Director, Living Oceans Society
    - Dr. Craig Orr, Executive Director, Watershed Watch Salmon Society
    - Robert Mountain, Musgamagw Tsawataineuk Tribal Council
    - Gerry Thorne, Aquaculture Campaigner, Georgia Strait Alliance
    - David Lane, T. Buck Suzuki Environmental Foundation
    - Jay Ritchlin, Marine Conservation Program, David Suzuki Foundation
3. The Committee adjourned to the call of the Chair at 3:54 p.m.

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Robin Austin, MLA  
Chair

Craig James  
Clerk Assistant and  
Clerk of Committees



FRIDAY, DECEMBER 1, 2006

The committee met at 9:08 a.m.

[R. Austin in the chair.]

**R. Austin (Chair):** Good morning. I'd like to open the proceedings here today. My name is Robin Austin. I'm the Chair of the Special Committee on Sustainable Aquaculture. We're here today to have a briefing from the B.C. Salmon Farmers Association. I'm going to ask that Mary Ellen Walling introduce the members of the executive who are here representing the Salmon Farmers Association, but I'd like to start by inviting members of the committee to introduce themselves.

**A. Horning:** Al Horning for Kelowna-Lake Country.

**J. Yap:** Good morning. John Yap, MLA for Richmond-Steveston.

**R. Cantelon (Deputy Chair):** Ron Cantelon, Nanaimo-Parksville.

**C. Trevena:** Claire Trevena, North Island.

**G. Robertson:** Gregor Robertson, Vancouver-Fairview.

**G. Coons:** Gary Coons, North Coast.

**S. Fraser:** Scott Fraser, Alberni-Qualicum.

**R. Austin (Chair):** Now we're just going to hand over the floor to Mary Ellen Walling and allow her to start making the presentation.

**M. Walling:** Thank you very much, Chair Austin. As you described, my name is Mary Ellen Walling. I'm the executive director of the B.C. Salmon Farmers Association. I think what I'd like to do is just start at the left-hand side of the table and ask the board members who have travelled to be with us today to introduce themselves and say a little bit about the companies that they represent.

**B. Hicks:** I'm Brad Hicks. I'm with Taplow Feeds. We're a relatively small feed manufacturer in British Columbia, and I guess one of our claims to fame is that we're trying to be in the organic fish business.

**O. Grydeland:** I'm Odd Grydeland. I have been in the aquaculture industry, specifically around salmon farming, for about 22 years. I'm currently working as a consultant based in Campbell River.

[0910]

I've seen this industry grow from its infancy in 1985 until today, where we're producing a wonderful product in a very strict regulatory regime and, by in large, in good cooperation with our first nations neighbours — who I think are looking at this industry as a growing opportunity for themselves.

**J. Henry:** My name is Justin Henry. I'm the operations manager with Target Marine Products on the Sunshine Coast. We're a relatively small aquaculture company there. We have a hatchery site, eight marine sites and a processing plant. We produce Atlantic, chinook and coho salmon. We also farm white sturgeon on a land-based site.

**R. Grierson:** My name is Ross Grierson. I'm with EWOS Canada, a feed producer here in Surrey. I had the opportunity to present to the committee earlier this year.

**D. Blackburn:** I'm Dale Blackburn. I'm with Marine Harvest Canada, based in Campbell River.

**K. Bullough:** My name is Keith Bullough. I'm with Pan Fish Canada, also based in Campbell River.

**G. Deacon:** My name is Greg Deacon. I'm a nutritionist and sales manager for Scretting Canada, which is a feed mill based here in Vancouver right by the Knight Street Bridge. I've been with the industry for 20 years this time around, but I actually worked on the first salmon farm in 1970. It was my first job.

### Presentations

**M. Walling:** I want to begin by thanking the committee for the opportunity to make this presentation. Over the past several months you have received many presentations from a wide range of stakeholders — from industry, from first nations communities and from environmentalists. You've heard from scientists and members of the general public, and the perspectives all have one thing in common. They are strongly felt.

You've also heard many personal stories throughout the past several months, and I wanted to just begin by also telling you my story. I am a mother and a grandmother. My husband and I raised our kids on a dairy farm in the Fraser Valley, and we moved to the coast of Vancouver Island in 1989, where we have lived ever since.

In my professional life I've held positions working in the field of community economic development, which is my passion. I was the manager for the consulting division of the Business Development Bank of Canada, looking after the north Island and central coast. After that I was recruited by North Island College to establish a division of industry training and community economic development.

I have worked in countless small communities on the north Island, coordinating and facilitating training and extension programs and building community capacity — in some cases, to respond to community transition. I've worked in Ahousat, Tofino, Ucluelet, Bella Coola, Port Hardy, Port McNeill, Port Alice, Tahsis, Zeballos, Gold River, Campbell River, Alert Bay, Sointula and the Comox Valley. I currently live with my husband and our two dogs in Black Creek.

I was there following the mine closure in Port Hardy, assisting the college and the skills centre with the transition training for the workers and their families. I ran a women's entrepreneurship program in Port McNeill to assist when the forest industry was in decline there. I was part of the transition team in Gold River when the mill closed, helping workers train for new employment elsewhere, and I've walked through the school in Tahsis, with my footsteps echoing in the hallways of a school built for 400 children. It now has 20.

For those of you from the Island and the north coast on the committee, you understand that when a job is lost in a small community, there are not a lot of options. In the urban centres, you go find another job. Yes, it's upsetting, but you can do it. In a small place like Gold River, when the mill closes, everything changes. The kids get taken out of school, and the family leaves. For the first nations communities, the services they need are not there. Government and educational institutions can provide transition and support in changing times, but they cannot invent an economy.

At that time I was very aware of the aquaculture industry. We ran a salmon farm technician program at the college, based in Campbell River. I knew some of the people in the industry from my community involvement, and we coordinated some specialized training for the workforce. As a former farm wife, I understand farming, and as a conservationist interested in salmon enhancement, I educated myself on the industry and its potential impacts.

I was satisfied by what I learned, but I didn't yet have the vision that I have today. Everything changed for me one day when I received a call from someone who worked for a salmon-farming company. Her company had signed a protocol agreement with a first nation, and part of the agreement was to provide employment opportunities on the farm and the processing plant for the first nations people, who all needed training.

She sounded worried. She had contacted the University of Victoria, the University of British Columbia and Malaspina University College, and they had all turned her down — too remote, not in their mandate, not enough resources. I was her last resort. Would I meet with her to discuss the situation?

The woman was Linda Sams, and the first nations community was the Kitsoo/Xai'xais nation in Klemtu.

[0915]

In the remote coastal community of Klemtu, about 200 kilometres north of Port Hardy, there has not been a commercial sockeye fishery for a quarter of a century. The local cannery closed in the late 1960s. Salmon farming, as you know — for those of you who visited the community — now constitutes the major share of the Kitsoo economy, creating significant employment in the farming, harvest, transport and primary processing sectors.

This has resulted in increased local capacity and spinoff benefits, and profits that are reinvested in expanding tourism opportunities have benefited both visitors and coastal residents. That's what you saw when you visited there.

On a personal level, I was at the graduation dinner six years ago to see the pride in the workers' eyes when they received their college certificates and the promise of a full-time job fulfilled. The partnership between industry, first nations, government and the educational institution made it work, but the leadership of the first nation and the economic muscle of the industry partner were the missing ingredients I had been searching for through all of those transitions in all of those communities over the years. When the salmon farmers asked me if I would consider working for them, I said yes. That was four years ago.

The B.C. Salmon Farmers Association represents, through its membership and board of directors, the men and women who work hard to raise the salmon grown here in British Columbia. Our association has been in existence for 22 years. We are based in Campbell River, just one of the coastal communities where our members live, work and play. We provide a forum for communication and cooperation within the salmon-farming sector.

We are a focal point for liaison between the industry, government and the public, and we work to provide information on salmon farming to interested members of the public and community stakeholders. We coordinate industrywide activities such as scientific research, and we make a contribution to building sustainable communities.

I work with the board of directors, many of whom you see here today, which is made up of the heads of the major farming and feed companies as well as representation from the supply side of our industry. We have a committee structure within the organization which provides me with direct access to the expertise within our member companies.

Our membership consists of all the major farm, feed, processing and supply companies in British Columbia as well as two first nations communities. We are linked to the international salmon-farming community through representation at Salmon of the Americas and the Canadian Aquaculture Industry Alliance.

B.C. farmed salmon is raised in a manner which respects and protects the natural environment. Farmed salmon is B.C.'s largest agricultural export, providing jobs and opportunities for more than 4,000 people living and working in B.C.'s coastal and first nations communities.

We support the men and women working in the industry in sustainable coastal communities by promoting best practices to produce wholesome B.C. salmon and protect B.C.'s marine environment, providing opportunities for stakeholder dialogue and improved public perception, representing industry before regulators and stakeholders, and facilitating cooperative development of new technology and research capacity to continuously improve environmental practice as an international competitiveness.

Salmon aquaculture entrepreneurship has helped to diversify the coastal British Columbia economy from its traditional reliance on resource industries while continuing to reverse the destabilizing trend of having our young people leave our coastal communities to

pursue opportunities in other provinces and the cities of the lower mainland.

Currently, more than 90 percent of aquaculture jobs are in coastal and rural communities. Our industry is an important employer in coastal B.C., as you've heard over the past several months, and the most recent report from PricewaterhouseCoopers states that our industry returns more than \$700 million annually to the B.C. economy. The strategic expansion of our industry will contribute to revitalizing coastal communities, further diversify the economy and generate wealth to support important social benefits such as health and education.

It's not just about jobs. We know that our industry will not be able to succeed unless we use sound ecological practices and manage resources sustainably. In our business and in every other sector we see the increasing need for the social, environmental and economic impacts of our actions to be considered a condition of business. Some people refer to this as a sustainability stool, with these three elements being the legs on the stool. For a business to succeed, both here in B.C. and internationally, we need to operate in a way that supports these elements.

Most of us who work in salmon farming live in B.C.'s coastal communities. We've raised our kids here. We invest volunteer time in community activities and regard our marine environment as an asset that we borrow from future generations. Through our member company efforts, we make an ongoing contribution to supporting the social fabric of the communities in which we operate and where we live.

In our industry we embrace strong regulations. As a condition of membership, our members adhere to a code of practice which has provided a foundation for the strong regulations we have in place today, as well as other programs implemented by several of our members, such as ISO 14001 internationally recognized environmental standards.

[0920]

The B.C. salmon-farming industry is governed by a very rigorous regulatory and management framework. It is subject to more than 52 separate federal and provincial statutes, regulations, policies and guidelines, as well as to numerous municipal and regional district land use and development regulatory instruments. This framework makes salmon farming one of most heavily regulated industries in the province.

Before a salmon farm licence is granted, 25 different provincial regulations must be met and 16 statistical reports are required. In addition, a series of government licensing criteria must be met, including regulations governing the location of the proposed farm and proximity to other fish habitats, national and provincial parks and wildlife refuges, particularly nesting areas.

Fisheries and Oceans Canada reviews site applications for compliance with applicable sections of the Fisheries Act, the Navigable Waters Protection Act, the Oceans Act and the Canadian Environmental Assessment Act. These assessments are very comprehensive and include consultations with other marine users, commercial fishers, marine transportation groups, recreational

organizations, first nations, and other federal departments and agencies.

In total the approval process can take more than three to four years, sometimes longer, for one site. The average cost for an environmental assessment for marine finfish aquaculture projects is approximately \$180,000 and as high as \$300,000 per site. I know that Tim Davies from our technical committee has walked you through the siting process, and I would ask that if you have any other questions about that, please feel free to call on that committee for additional clarification.

Once a site is approved, we take our commitment to environmental stewardship seriously. A recent report out of the Centre for Aquatic Health Sciences estimates that the annual environmental monitoring costs are \$4.5 million per year.

The investment and the hard work of our member companies are producing results. The provincial government announced in August that a review of their regulatory audits of farm operations shows a high level of compliance overall by the 77 operational or active sites inspected in 2004 and the 75 sites inspected in 2005. According to the provincial audits, in most cases for 2005 companies were in the 90 to 100 percent range for all compliance components. Our members and their staff are to be commended for their efforts to achieve this high level of compliance.

Again, I would be very happy to arrange for a technical committee to meet with the committee to provide you with additional details on this aspect of the industry. As well, I have a copy of the provincial audit for your information, should you not have already received a copy. I'm sure they'll make those available to you.

The search for viable improvements for activities that balance economic goals with environmental imperatives is a position that we fully support. Over the past 20 years our companies have invested millions of dollars to develop farming technologies and techniques that minimize environmental impact. We recognize that we must continue to invest in new technologies and research to continually improve our environmental performance. Like in any business endeavour, there are gaps in scientific and technical information that arise. I'm going to touch on this in more detail in a moment.

Moving forward, we see the need for informed public discussion and a focus on areas of concern. Key stakeholders have a variety of interests and concerns that must be addressed. From our industry's perspective, we wish to avoid any adverse impacts not only on our activities but also on the environment. We rely on a healthy environment to grow our fish.

Internationally, some of our members have participated in the salmon aquaculture dialogue with the World Wildlife Fund. Locally, there are several ongoing efforts at discussion and collaboration — the Marine Harvest-CAAR dialogue, the first nations partnerships and monitoring programs, and local stewardship groups. These are all considered important activities by all our members.

It remains important to invest in the rigorous scientific research that is required to address substantive

issues rather than rhetoric and perceived issues. Food safety is a good example. I can't tell you the challenges that our industry has faced around the recent PCB studies and the thousands and thousands of dollars that we've had to invest in research to address these concerns. Ironically, the constant attacks on our industry consume a tremendous amount of industry time and resources which could be focused on innovation and investing in worker education and development.

How do we get from where we are now to where we might be in the future? There are a couple of background pieces of information that we thought might be useful to provide some context for our discussions.

Humans have been tending useful aquatic plants and animals for thousands of years. However, it has only been in the last several decades that aquaculture has expanded in scale and diversified into many new species and technologies. With global demand for seafood increasing and natural stocks already at or exceeding their maximum capture potential, it is evident that aquaculture will play an increasingly important role in the world's food supply.

According to the Food and Agriculture Organization of the United Nations, the world must turn to aquaculture to ensure low-cost protein sources to feed a growing world population, estimated to reach between nine billion and ten billion by 2050, as the availability of fish harvested from capture fish fisheries cannot even now meet the current demand.

[0925]

Salmon farming, as you know, is one of the newest and fastest-growing types of aquaculture. Norway was the first country where the salmon-farming industry established itself and grew significantly in size and in the volume of salmon produced.

In the early 1980s there was encouragement for entrepreneurial investment in the development of salmon farming, which laid the groundwork for today's salmon farms along the B.C. coast. A relative newcomer among B.C.'s resource-based industries, we've become a vital part of the local economy in many coastal and first nations communities. Today the industry accounts for about 15 percent of B.C.'s total agriculture production and hundreds of millions of dollars in economic activity.

But the path proved challenging for the young industry. Early salmon farm operators had much less refined equipment and expertise than is now available, and as a result, they faced a very steep learning curve. The industry went through a period of considerable consolidation and renewal, and what emerged was an industry with fewer players but with larger and more efficient operations.

Since then, production has grown as the industry has significantly enhanced its technological sophistication, production efficiency and the quality of its environmental management. In a very short period of time it has moved forward from its humble beginnings and evolved into a major producer of quality seafood in Canada for established markets, mainly in the United States.

It's important to understand a little bit about the international seafood business. The total amount of farmed salmon produced in 2005 in the world was 1.3 million tonnes, according to a recent report produced for Agri-Food Canada. Of that, Canada produced 109,000 tonnes, or 8 percent of the total production in the world. About 65 percent of that was from B.C., and much of that salmon is grown and processed near Campbell River, Port Hardy, Port McNeill, Tofino, Gold River and Sechelt.

While we are the dominant supplier of fresh, whole farmed salmon to the U.S., Chile is the dominant supplier of value-added fillets, portions and other products to this market. So the Chileans are our big competitors in the U.S. market. Where we shipped 70,000 metric tonnes in 2005, Chile shipped 488,000 tonnes into the U.S. market. Norway last year produced ten times as much salmon as B.C. — almost 700,000 tonnes. Here at home we are B.C.'s largest agricultural export; on the world stage we are a small player.

The Agri-Food Canada study I'm referring to looked at Canada's and British Columbia's salmon-farming industries and benchmarked where we sit in terms of international competitiveness.

Why is this important? As one of the committee members recently asked, if companies farming salmon are operating in several different countries, doesn't that mean they really aren't competing? Why did the committee's motion recommending no new site approvals to proceed cause such concern within the salmon-farming industry? Why do workers in processing plants, who understand the interconnectedness of the farming industry as it directly relates to their processing jobs, write letters to your committee wanting to be part of the public process?

One of the answers is that companies have options as to where they wish to invest. There are several factors that go into making these investment decisions, and there is fierce competition for these investments.

The Agri-Food study also looked at five key benchmarks to compare Canadian farmed salmon performance in the international contest by physical capability — that is, growing conditions; government regulations and policy; operations and infrastructure; input costs — smolts, feed, labour; and market penetration and performance. The report concluded that B.C.'s key advantages were proximity to the U.S. market — farmsite to customer within 48 hours and a transportation cost advantage; quality of product — greater shelf life, water quality and our food safety system; and familiarity with the U.S. market — ease of doing business in this market. We speak the same language, as an example.

The major disadvantages faced by B.C. and the Canadian industry are, according to this report, lack of harmonization and clarity between provincial and federal governments regarding the regulatory framework, which is preventing access to sites; lack of clarity and capacity around first nations consultation; lack of effective communications on the health benefits of seafood and to counter ENGO falsehoods; and higher input costs.

The report concludes that input costs and effective communication can be overcome, but that regulatory certainty is the gatekeeper to industry viability and growth. Creating a good climate for investment will build trade for us here in coastal British Columbia and communicating how we have moved our industry from small mom-and-pop operations, which were under-resourced and undercapitalized, to the modern efficient operations of today is another key challenge and one of the opportunities we all share.

I'd just like to pause here and say that in my office, we receive calls on a frequent basis — not a daily basis, but probably every two or three days — looking for farmed salmon from British Columbia. They're calling us as a last resort. This is after they've contacted all my member companies and asked them for an increased supply, which they cannot meet the demand for. So they call us, thinking that we have somewhere a secret stock of this salmon that we can provide to them.

[0930]

I think it's important for the committee to understand that we cannot meet the demand for our product in the U.S. market. That market is growing faster than our ability to supply it. As you heard from the comments I made about Chile's competitiveness in that market, they are taking a bigger and bigger portion of that market.

I want to speak a little bit about regulatory consistency. A clear and predictable climate is needed for any business to thrive. Without this certainty, business cannot plan ahead and cannot make business decisions in a timely way, and the benefits that would accrue to coastal communities would be lost.

We are required to obtain approvals from a number of different agencies with differing requirements and time lines, which leads to inconsistent and conflicting outcomes. The inability to have timely access to new sites is affecting the industry both economically, by decreasing our competitive position and delaying the potential for the growth of our business, and environmentally, by reducing opportunities for flexible management.

We think there is a better way. We think that good public policy decisions are made after careful consideration of all the relevant facts and information available. As well, there is an opportunity for the different levels of government to communicate what they are doing to regulate and monitor the industry and protect the environment.

That is why we are recommending that the committee make recommendations to ensure that the provincial and federal governments maintain and continue to enforce the current high standards of regulatory requirements to make certain that B.C. retains its position as the most stringent regulatory environment among salmon aquaculture countries.

Protecting wild salmon. The real issue and challenge not just for us as salmon farmers but for all the residents of B.C. and for the many people who come to our waters to catch fish and to visit our beautiful province is this: what should we be doing to protect wild salmon?

A recent poll in June showed that British Columbians are interested in environmental issues and, not surprisingly, have an opinion on them. When asked what the number-one environmental issue facing British Columbians was, they did not take a narrow view. They had a wide range of responses, starting with logging, the number-one issue at 14 percent, followed by water — this was early in the summer before some of the drought challenges, but even so, water conditions were on people's minds — clean air, quality air, air pollution, global warming, unspecified pollution, mountain pine beetle, automobile exhaust pollution, waste removal and treatment, overdevelopment, urban sprawl and traffic congestion.

Salmon farming is tied for the bottom four at 1 percent to 3 percent, along with overfishing, mining, greenhouse gas emissions and the petroleum industry. But all of these concerns have the potential to affect our environment and our wild salmon population.

We know that salmon farming is one way to meet growing global demand for salmon in a way that doesn't put undue pressure on the wild stocks. We know that salmon farming can be regulated to ensure the marine environment is protected and a sustainable industry can grow and flourish, even under our tough regulatory framework like we have here in B.C. We know that with continued investment in research and technology, we can ensure a culture of continuous improvement.

We are playing and will continue to play our part, but that alone will not solve the problem. We know there are declining salmon stocks in the Fraser River, in the Skeena and many other parts of the coast from the coast of California to Alaska. The southeast Alaskan purse-seine fishery shut down for the first time in 18 years because of poor returns. The low returns on the Skeena of pink salmon this year were described as a disaster.

There are no boundaries for our wild fish, and there should not be boundaries for our participation in resolving the larger issues which face our environment — flooding of watersheds, drought conditions as freshwater supplies are impacted by development pressures, impediments to fish migration and changing ocean conditions.

As the provincial Auditor General concluded in 2004, the solutions will require the active participation of many groups. As we look forward, this is the issue of concern, and it is a challenge that cannot be blamed on or solved by one industry. Here in British Columbia we need to work together.

We'll do our part, and we are confident that when we embrace a common goal of protecting the wild salmon, it will bring out the best in us. That is why we are asking the committee to recommend to the government that they prepare a government policy for protecting wild salmon, using the findings of the 2004 Auditor General report 5, *Salmon Forever*, as a starting point for discussion.

There are some key opportunities that are open to us to work with other sectors to strengthen B.C.'s place in the world economy by building diverse local economies on the coast. You have heard from some of the tourism industries concerned about the protection

of B.C.'s wild stock and preserving a natural environment for visitors to enjoy at certain times of the year. We understand that, and because we also live here year-round, we want to live in a beautiful place too.

[0935]

We think there are many good examples about how we have successfully blended our common interests in achieving sustainable development in our communities. For example, Gold River is home to Grieg Seafood's hub of operations, with the land-based freshwater hatchery and farmsites located in nearby Nootka Sound and Esperanza Inlet. Businesses in Gold River benefiting from salmon farming include the transportation, hospitality and accommodation, grocery and retail, and building services sectors. Grieg Seafood's total payroll is \$2.5 million annually, and close to one-quarter of their staff live in the community.

But it's not just about economic benefit. Grieg is the main sponsor of the Nootka Sound Watershed Society and has contributed over \$120,000 for enhancement activities, raising smolts for release to support recreational and commercial fishing sectors — a direct benefit to the tourism community.

A well-known tourist attraction, the MV *Uchuck III*, runs a thriving year-round business. They carry visitors to Friendly Cove and other local attractions in the summer months, but they sustain their operations with Grieg Seafood as their major client for deliveries of feed, equipment and supplies to farms located in the area.

Sechelt is another good example; Tofino is another. Tofino enjoys a lively summertime tourism sector and benefits from year-round, well-paying salmon-farming jobs. When the tourism industry faced sustainability issues due to low water levels in the town reservoir this past fall, the salmon-farming community was one of the first to respond by trucking fish out to process and trucking water in.

There are many, many more examples of how we have successfully worked together to blend our common interests, which are good examples of how to work cooperatively together moving forward. That is why we are recommending that the committee make recommendations to safeguard the continued viability of existing salmon farming and processing infrastructure, to support coastal communities and enable the sustained growth of the aquaculture sector by issuing timely approvals of new sites which meet regulatory requirements for environmental protection.

Here in British Columbia we have a wonderful opportunity. We have some of the best growing conditions in the world for aquaculture, and we have, for the most part, healthy wild stocks for our capture fisheries. We could work together to create a vibrant B.C. seafood industry. As I told you, there is a strong and growing demand for seafood in the United States but also in Asia, which is a huge untapped market for us, and there is an increasing understanding of seafood, especially salmon, as a healthy food choice. There is the opportunity that we share.

We could combine forces and work together to provide products that are farmed and captured in ways

that are sustainable both economically and environmentally. We could work together to increase the number of seafood consumers by expanding the demand for fish as a healthy food choice. We could look for opportunities to partner together, develop niche markets, learn from each other in improving processing expertise and enhancing product development. We could build B.C.'s reputation as a centre for culinary excellence for seafood and other products, like our wonderful wine industry.

We know we can demonstrate traceability in food safety programs that are some of the finest in the world. We could join forces to share that important benefit with the consumer. Or we can continue to see a fragmented market becoming even more fragmented and confused — unsure which is better, farmed or wild; worried about claims being made that farmed salmon is poison. It's no wonder that our workers get frustrated.

We know that salmon, both wild and farmed, is a safe, healthy and delicious food choice. Salmon farming done well is an important contributor to B.C. coastal economies. Together we can find more opportunities to supply a growing world population with a great source of protein, and we could celebrate, and can celebrate, the many choices of seafood that British Columbia brings to everyone's table both here in B.C. and around the world.

That is why we feel the committee should recommend that the B.C. government promote a sustainable, value-added B.C. seafood industry supported by the culinary sector, the educational institutions, aquaculture, the commercial fishery and processors of seafood product.

I was really encouraged to see the number of people participating in the public hearing process, and I was particularly moved to see so many young people from our industry who feel passionate about the future.

While I hope you as committee members will come away with an enhanced understanding of our industry as an environmentally sustainable way to meet the demand without putting undue pressure, making a valuable contribution to strong and diversified coastal communities, I think you have a difficult job. I've told many of you this before individually. You are lay-people being asked to assess complex scientific, technical and economic data and to respond to some very emotional arguments.

We are in total agreement with those who say salmon farming must be done in an environmentally sustainable manner. The aquaculture industry will not be able to succeed unless it uses sound ecological practices and manages resources sustainably. Public interest in health, safety and the environment has contributed to a culture of continuous improvement on B.C.'s salmon farms. We agree that there is always room for additional improvement, but today salmon farming is the most strictly regulated agriculture industry in the province.

[0940]

Many issues were raised during the public hearing, and some of these issues require clarification, as the information provided was inaccurate, incomplete or incorrect. I just want to touch very briefly on a couple

of these issues in order to ensure that this is on the public record. Feed is one of them. For example, the allegations that salmon farming takes between 2.5, 3.5, 6 and 7.5 kilograms of wild fish ground up as meal or oil to produce one kilogram of farm salmon, and that the species used for feed is not fished sustainably and is denying poor people in poor countries access to this resource are incorrect. The conversion figures presented above are 15 years old. Today the average feed-conversion ratio is 1.2 to 1.

Salmon are the most efficient converters of feed of any land or aquatic farmed species. The use of underwater cameras to monitor the amount of feed required at each farm means little food is wasted. The types of fish used for feed are typically small, bony species that reproduce quickly. Fishing these species creates local jobs and opportunities, and the fishery has proven to be one of the most stable fisheries in the world.

Research into alternative protein sources is yielding positive results, and as we heard at the WWF meeting yesterday, Canada is in fact a world leader in this research. This will further improve efficiency rations. I'd be happy to provide you with additional details on some of the research studies underway.

Another issue we heard about during the public hearings was escapes. The allegation is that Atlantic salmon, if they escape, pose a threat to B.C. wild salmon by interbreeding or crowding them out of their habitat, and that our workers are lying about reporting escapes. The concern has been raised that Atlantic salmon could colonize in B.C. waters and pose a threat to local wild populations. Some people claim this is already happening as a result of Atlantic salmon escaping from farmsites along the coast.

One person appearing before the committee stated: "It is documented that there are Atlantic salmon in every stream and every river on Vancouver Island, and in many of those rivers they are reproducing." There is no evidence to support the allegations cited above.

In 2001, 117 surveys were carried out in 55 different river systems on Vancouver Island, and this is after 20 years of farming in British Columbia. Over 389,000 salmonids were counted during the surveys, only two of which were Atlantic salmon. Since that time escapes, which must be reported and are reported, have declined significantly.

It is true that in the early days of B.C. salmon farming, when farmers were still in a very steep learning curve, significant numbers of salmon escaped. This occurred mostly during storms when peak winds, waves and tidal currents broke anchor lines and pen structures and allowed the nets to tear. Escapes have also occurred in the past as a result of accidents with boats, tears in the nets from predators and human error.

Some specific measures in use today to prevent escapes include improved net management, better farm anchoring and guidelines for vessel operations near farms. Anytime a farmed salmon escapes its net pen and enters the wild marine environment, it represents an economic loss for the farmer. Therefore, there is a strong business incentive to prevent this from happening. We will continue our hard work in this regard, and

I can assure you that our workers report every escape. Whether it's one, two or ten fish, they report it.

Critics of salmon farming allege that waste from the farm creates a dead zone under the farms that can extend beyond the farm perimeter, negatively impacting the ocean floor around the farms. In fact, much scientific research that we and the Department of Fisheries and Oceans and the Ministry of Agriculture and Lands have reviewed shows that impacts are limited and temporary.

Salmon feces and uneaten feed can fall to the bottom under a farm faster than they can be consumed by marine worms, crustaceans and other marine fauna. These materials cause temporary oxygen reduction and other chemical changes in ocean floor sediments as they decompose. Impacts are limited in part because salmon farms are sited in deep water. Some of the organisms that live in the sediments under the farms in fact thrive under salmon farms, because the waste is a source of food for them. One study found that the total abundance of bottom-dwelling animals under the edge of salmon farms was significantly more than what would have been naturally found there.

The most talked-about issues, sea lice and closed containments, are ones that we as an industry recognize as concern. We can never rid the environment of sea lice, nor should we, as they are part of the marine environment and the ecosystem and have their own role to play in the web of life. But we can ensure that farm fish enter the marine environment lice-free, that we use good husbandry practices to reduce the risk of lice and that we move quickly to treat any outbreaks.

[0945]

With continued cooperation and strong effort by our companies, this is an issue that we are addressing. Unfortunately, there appears to be a lack of collaboration and agreement in the scientific community on this topic, and industry gets caught in the middle. One of the most recent sea lice studies, claiming that up to 95 percent of wild salmon are killed from sea lice coming from salmon farms, is an example of this polarization. The authors of this paper assert this as conclusive groundbreaking work, but other very credible scientists do not agree with the results. I understand the committee is convening a science panel next week to address this and other scientific issues, which should prove to be helpful to the committee moving forward.

There has been a great deal of talk about closed containment during this public hearing, and I hope you've had the opportunity to meet with the Pacific Salmon Forum, who convened a panel on this subject, as well as reviewing the report from the Ministry of Agriculture in November 2005 on the three pilot projects already undertaken.

There seems to be a great deal of confusion and disagreement about, first of all, what closed containment is, whether this technology is practical and possible, and whether there are places in the world that have successfully piloted this technology on a commercial scale for salmon.

Commercializing a new technology or innovation is challenging. Turning an idea or invention into a useful

product or service requires sustained investment, sometimes through many trials. Currently there is no commercial-scale production of salmon in a closed containment facility anywhere in the world, either land-based or sea-based.

In the past two decades, industry has invested millions of dollars in research and development on new technologies. Some advances — such as remote-operated vehicles that monitor the seabed under salmon farms, state-of-the-art recirculation technologies for our freshwater hatcheries, and environmental monitoring technologies — were developed and pioneered here in British Columbia. They constitute technologies now in use around the world.

Anything that helps us grow our fish more efficiently and does not negatively impact the environment is of interest to us. Of course, as a business, we must also be able to see a return on our investment. We are responsible to our shareholders, to our employees and to our communities. We will continue to invest in researching opportunities to measure effectiveness for growing fish and to weigh all environmental impacts.

At the moment we feel strongly that the best option from a fish health and environmental perspective is to raise ocean fish in the ocean in sea pens. We anticipate that there will be continued research into different technologies and, frankly, that there will be continued debate about it.

If it is the intention to transition the industry to land or other unproven technologies with the time line already established for doing so and some groups calling for this as an interim strategy leading to the eventual phase-out of the industry altogether, this is of real concern to us. The committee needs to be very clear on its position regarding this.

We feel that the appropriate action at this point would be to initiate a thorough literature review and examination of all aspects of different closed containment technologies to identify appropriate research priorities. It seems prudent to us to provide a clear focus for research objectives as a starting point for this next phase.

Research funding is scarce, so before considering an investment into a research program, it would be wise to identify clearly what outcomes are needed and what practical knowledge could be gained. That is why we are asking the committee to recommend that the government initiate and fund a review and examination of all aspects of closed containment technologies and possible practical applications in a B.C. context; and to support collaborative research to continuously improve industry performance in all areas of research, including vaccine development, feed efficiencies, environmental technologies and so on, using regionally based research facilities wherever possible.

In closing, as the committee reviews the evidence before it, we hope that you will give careful consideration to the following: the impressive record of regulatory compliance I referenced earlier; the economic contribution salmon farming makes to the province; the healthy product we produce, which provides a nutritious source of protein for a growing world; the oppor-

tunity, with managed growth, to position B.C. as the sustainable supplier of choice in a growing global seafood market; the jobs and opportunities created for men and women who want to live and work in our small coastal communities; the commitment of industry to environmental sustainability; and our willingness to partner with scientists, academics, government officials and business leaders to address issues of concern, such as sea lice and closed containment.

The committee must also focus on its mandate — the development of a sustainable aquaculture industry. Moving forward, I would like to repeat the suggestions for recommendations for your consideration: ensure that the provincial and federal governments maintain and continue to enforce the current high standards and regulatory requirements to make sure that B.C. retains its position as the most stringent regulatory environment among salmon-farming countries; safeguard the continued viability of existing salmon farming and processing infrastructure to support coastal communities; enable the sustained growth of the aquaculture sector by issuing timely approvals of new sites that meet regulatory requirements for environmental protection; initiate and fund a review and examination of all aspects of closed containment technologies and possible practical applications in a B.C. context; support collaborative research to continuously improve industry performance using regionally based research facilities wherever possible; prepare government policy for protecting wild salmon using the findings of the 2004 Auditor General's report 5, *Salmon Forever* as a starting point for discussion; and promote a sustainable, value-added B.C. seafood industry supported by the culinary sector, educational institutions, aquaculture, the commercial fishery and processors.

[0950]

In closing, I would like to thank the committee for the time they have taken to meet with our industry and staff, and to tour some of our facilities. We appreciate the interest that you've shown in our industry, and we look forward to working with you to create sustainable aquaculture opportunities to benefit all British Columbians.

**R. Austin (Chair):** Thank you, Mary Ellen. We'll open the floor to questions.

**S. Simpson:** Thank you for the presentation. I apologize for being a couple of minutes late getting here.

I have a couple of questions. Mary Ellen, you made a comment about the need for better collaborative efforts here to move things forward and try to ease this polarization that there has been around aquaculture. I think that's sound advice. If we can find ways to do that and get people on both sides of this debate talking to each other in a different kind of way, it would be a huge plus in terms of deciding what issues are real issues — and how they get addressed — and what issues aren't real issues.

One of the efforts going on, which certainly has caught my attention, is the discussion that has gone on for the last year between Marine Harvest and CAAR,

attempting to do exactly that. That's my sense of it. Listening at the salmon dialogue when they presented, I was quite heartened that a year after they started talking, they're still talking. There seems to be some progress being made on some of these things — slow, but there's some progress being made.

Just as one example, I don't know the details, but I understand they've reached some terms of reference or some understanding between the two parties on what an exploration of closed containment might look like — what they are saying it might look like. I'm assuming it then is not satisfying everybody's interest on either side of this.

What I'd like is if you could talk a little bit about the view of the association around those efforts between Marine Harvest and CAAR to find some common ground, to find a different way to talk through these issues and see if they can come to some common agreement on what the facts are — what's fact and what's fiction, and how to get at those things.

**M. Walling:** Well, from the association's perspective — and we've had a lot of discussion internally about the Marine Harvest-CAAR dialogue, as you might imagine.... The association is fully supportive of the work that Marine Harvest has been doing in the dialogue with CAAR. I think it's also very important for the committee to understand that all of our member companies contribute in their own way to different kinds of dialogue within the communities in which they operate. For example, Grieg Seafood is not with us here today, but they're very active on the Nootka Sound Watershed Committee. Creative Salmon participates in a number of different community groups and with the Tla-o-qui-aht First Nation out in Tofino.

From the association's perspective, there's not a one-size-fits-all, and I think it's entirely appropriate for Marine Harvest, as the largest company still operating in British Columbia, to initiate that kind of dialogue with CAAR. Perhaps, Dale, if you want to say anything about the dialogue....

**D. Blackburn:** No, simply that you're correct. Terms of reference are very close to completion on moving forward towards looking at possible options for closed containment.

**S. Simpson:** Maybe just a bit of a follow-up on that. Are there other approaches? That one, as you say, is very specific to Marine Harvest and CAAR, though presumably whatever they learn in that exercise is going to be of value to lots of other people in the industry and people who are looking at the industry. I would hope so, anyway.

[0955]

Does the association have any suggestions for us about ways to expand that collaboration or about other approaches to collaboration specifically related to solving these challenging questions around the industry — which, I assume, are the reasons the committee exists?

**M. Walling:** I think that's an excellent question and one of the challenges that faces all of us.

One of the things I've been seeing is that there doesn't seem to be really any neutral place where information is collected and can be disseminated to the general public. So for us, we make every effort on our own website, which is our major communications tool because we have limited resources within our association. We use our website to try and provide a source of information. But we have our own perspective, because we are representing the industry. We have our own way that we would frame some of the issues around the debate. In fact, I think we even link to the CAAR *Farmed and Dangerous* website on our website in order that people have full access to information.

But what I do see and what I hear from people in the communities is that there isn't one credible source of information that they can go to, to get questions answered about salmon farming in B.C.

We participate every year at Eat Vancouver, which is B.C.'s largest food and culinary show, at B.C. Place. It's one of the highlights of our year. There are, I think, about 22,000 people who go through our booth every year. Last year we handed out 43,600 samples of farmed salmon, so you can see that people are coming back for seconds and enjoying the product. But really, the benefit of that is to be able to talk directly to people. They have a lot of questions about food safety, PCBs, mercury in fish, sea lice, siting, and there doesn't seem to be a place where they can get some of those questions answered. So perhaps one of the suggestions might be to find a way to provide a neutral body to provide that kind of information to the general public who are looking to gain information.

Certainly, if any of my board members have other suggestions, I encourage them to put them forward.

**O. Grydeland:** I think, Mr. Simpson, one of the areas that I looked upon, and I think we all do, is a valuable initiative by a number of the companies to work closely with their first nations. I mentioned that in my opening statements. I think it's fair to say that most of the companies operating in B.C. now have an understanding, have some sort of an agreement with the first nations in the areas that they operate in.

We've also seen the formation of an Aboriginal Aquaculture Association, which I'm sure you heard about, which I think will be a very important body for providing accurate and factual information about this industry as we move forward. I just want to point that out.

**D. Blackburn:** I may, having been involved with the very, very first meetings.... Although our dialogue was signed in February of '05 — it's coming up one year — our discussions were almost ongoing for well over a year prior to that time. It was not an easy task to get together and to sit across the table from people who have been stridently opposed to everything we do.

The way to bridge that is to stop looking at the differences and start looking at the areas we have in common. That would be my recommendation to everyone here on the committee. If you want to have negativity, then listen to that. Fine. Then we'll have

polarization and debate. But if you start looking at what we're really all about — and that's a healthy, sustainable salmon farming industry that cooperates fully with the wild industry and industries that do not deplete the natural resources — and you start building on that, then I think there's room to move forward.

You'll find that we have far more similarities than we do differences. We all have families. We all love the great outdoors. There are many, many things that we like to do together, and if we work on that, we can solve problems. But as long as we take one or two focal points and make them the highlight of everything we talk about, whether it's sea lice, benthic impacts or contaminants in our food, we're going to be miles apart. When you get below the rhetoric, you'll find out that, really, the differences aren't that much at all.

[1000]

That's what we've done with CAAR. It has been very difficult, and I'm sure people from CAAR will say exactly the same thing. It has not been easy, but we're there, and we're committed to making it work, because two heads working together are a lot better than two heads fighting.

**S. Simpson:** Thank you for that. I've certainly spoken to people in CAAR, and I think that both Marine Harvest and CAAR deserve a lot of acknowledgment for setting aside issues and making this choice to come together in what was certainly a challenging effort to build enough trust between the two organizations to be able to actually have these substantive discussions. I think it's a real step forward, and you both deserve a lot of acknowledgment and credit for the work you've done.

I have one other question, and it actually relates somewhat to the question around the relationship with first nations. It seems that one of the things that we've been learning is that when we look at the industry today and where the future of the industry may be, the coast is a bit of two different places.

Maybe it's around Cape Caution that you could draw the line. You have a fairly well-developed infrastructure in the south, with a significant number of farms and industry. North you have, obviously, the farms at Klemtu and the interest around the Kitasoo there but not a heck of a lot else going on. I could stand to be corrected on this.

Certainly, the first nations that we spoke to when we were on the central and north coast — with the noted exception, of course, of the Klemtu and the Kitasoo, one who has a longstanding involvement in the industry and the other who is interested in exploring and looking at getting into the industry.... We clearly heard from....

**R. Austin (Chair):** I think you mean the Kitkatla.

**S. Simpson:** Kitkatla. Excuse me. What we know is that the other first nations have been less enthusiastic, certainly, in their discussions with us. I'd be interested in whether the association has a view about how it sees approaching what are two clearly different places on the coast, in terms of the future of the industry from your perspective.

**M. Walling:** Well, from my perspective, I think it's inherent on.... I mean, this is a first nations decision. This is not something that the association would say: "Well, just draw a line on the coast and, you know, restrict activity and opportunity." I have worked in communities where there has been an unemployment rate of 85 percent. When you have an unemployment rate of 85 percent, that means that really the only jobs are in the band office handing out the welfare cheques.

This is not a healthy situation for British Columbia and for communities on our coast, and I find it personally really upsetting. I find it very upsetting, and so I think that if communities like Kitkatla.... Chief Clifford White actually spoke at the WWF meeting yesterday morning about the opportunities that his community sees moving forward for salmon aquaculture. I think there's also some real interest in shellfish aquaculture development on the coast.

It is the responsibility of those communities to make decisions about how they want to proceed, particularly when it's within their own traditional territories. Then the companies can play a partnership role in achieving that. I don't know if any of the other members of the board would like to add to it.

I would like to introduce Moses Martin. Chief Martin is here and should actually be sitting up at the table with us, because he's representing Creative Salmon.

I'm very glad you travelled to be with us, Moses. If you'd like, you can come up and sit with us.

**K. Bullough:** I think one of the things I'm most proud of in being involved in this industry is the record the industry has in developing partnerships with first nations. It's something that our company has done historically. It's something that other companies have done historically, and it's not something that you see a lot of in other industries or industrial activity in B.C. It was recognition of the problems inherent in unresolved treaties and companies looking for business certainty.

[1005]

At least our perspective was that the best road to that certainty was to develop an agreement directly with the first nation, rather than wait for a treaty process that could take two years, but it could take 20. If you ask some members of first nation communities, they might suggest it could take 200. So our approach was to deal directly with the first nations.

We have agreements with first nations in whose territories we operate in the Port Hardy area, and we developed an agreement with Kitkatla to pursue opportunities in their traditional territory. I don't want to get into a debate about treaty issues.

**S. Simpson:** No, fair enough.

**K. Bullough:** I don't think that's the role of this committee, and I don't think we have any answers either. From a business perspective, it's a difficult environment to operate in, and the best way to address that, from our perspective, was to develop agreements with first nations. Irrespective of the treaty process, we had an agreement to do business with them.

**R. Cantelon (Deputy Chair):** Maybe just carrying on with something that Shane said. I think if this committee has a role, we can perhaps try to develop the basis of dialogue somewhere between the myth on one side that we've heard and even facts that we can't quite seem to agree on. We have science, and then we have.... We seem to be developing arguments about whose peers are better than the other peers, and I don't know if that's going to lead us to any definitive conclusion.

Clearly, any process or system that would, as you say, Mary Ellen, provide some neutral ground where the diverse parties seem to be able to agree — as Dale indicated, we agree on these things — I think would do a lot to promote and dispel some of the prevalent myths.

I'm encouraged by what CAAR has done with the industry, but I'm also concerned about their comments that they do — and I respect that — want to keep it with the industry they have. One of the municipal people got up and said: "Well, we're not in it, and we'd like to be in it." Of course, they're developing criteria for the potential, perhaps, of closed containment, but as we heard yesterday, so are the federal and provincial governments, apparently.

We'd certainly like to see all of these things....

**S. Simpson:** That would be good to know about.

**R. Cantelon (Deputy Chair):** It would be good to know about. It would be good for the committee to know about, I think. But it would be nice if we could develop some sort of forum to clear the air.

Now, coming, rather long, to a question. One of the issues we heard.... I think the head of the world wild-life federation, the man who announced it yesterday, spoke about performance-based monitoring, because sites are different, and you can't use finite regulations across the board because conditions at each farm are different. I was encouraged that someone from an international perspective provided a comment that endorsed British Columbia's approach to regulation.

Where I'm going, Mr. Chair — and I appreciate your long indulgence here, although other members have also been well-indulged — is to the issue of transparency in whatever form we can come to, and if this committee can provide direction in establishing it. There seems to be — well, not seems to be.... There is clearly a lack of trust among parties that the industry isn't being transparent enough, that the fish health reports or whatever aren't readily available.

I'd like any advice you can give on the industry's position and willingness to make the appearance of lack of transparency disappear so that people have complete access to all information that they may seek. Is the industry willing to do that?

That's really my question — finally, Mr. Chair.

**M. Walling:** I'll start with that. I think that from the association's perspective, we respect the right of our member companies to make information available to whoever they choose to make it available to. We have to also recognize that we are in a fiercely competitive

seafood industry. We operate in a global environment. We have some information that the companies would consider proprietary, so the association respects that the companies may not wish to reveal every single detail of their operations or of how they wish information provided.

The fish health database is very comprehensive. The results are made available to the provincial government, which posts them on their website. We heard from our colleagues in Norway yesterday that in fact it is more extensive than the information that's made available in Norway — which is also provided on a combined basis, based on zones.

I'm not sure if any of the board members want to take a stab at this one, but that's where we're at, from the association's perspective, at this point.

[1010]

**B. Hicks:** I'll take a little stab at it. Gregor Robertson, you have a company that produces products that has recipes. Do you think, as a proprietor of a business that has recipes, that those recipes should be made public?

**G. Robertson:** Is that a rhetorical question?

**B. Hicks:** No, that's a serious question. The question I heard coming from you is.... I run a business and I have recipes — ways of doing things — and I was asked if I should make my recipes public. I don't know what all the members of the committee do, but I do know you have a business that has recipes. If you're asking as a committee if I should make my recipes public, I'm asking you that question, because I think you are the one member of the committee who may have the fullest understanding of the question.

**G. Robertson:** Well, I'm not sure there's a.... It's apples and oranges, I guess, to continue to the metaphor.

You are obviously required to label. CFIA and Health Canada require us to put all of our ingredients on our labels so everyone who picks up a product off the shelf knows exactly what's in it. The specific formulation is not easy to discern for most people, but the nutritional information is on every product, as well, so that differentiates it from fish at the market.

**B. Hicks:** My response to that would be that we do the same thing. We are that transparent.

**G. Robertson:** In terms of labelling?

**B. Hicks:** In terms of labelling, we have to have the same nutritional labels that you have to have. It doesn't apply separately to you.

**K. Bullough:** Feed manufacturer.

**B. Hicks:** Yeah. We are also under CFIA, just so you understand that we are under the same rules you're under. But that's not my question. You have asked us to tell and be transparent in exactly every nuance.

I understand that your label has to have the ingredients, but they're not proportional. For instance, the exact source of the ingredients is not there on your label. Yet you're asking us to supply all of that information. In other words, you're asking us to supply enough information that, if I went to your website and looked at your information, I could do a knockoff exactly as you have. I just don't understand how that's a reasonable request in business.

I'm asking you, as the one member who has recipes: would you be willing to put on your website all of your ingredients, proportions, processing mechanisms, etc.? That's what you're asking us to do.

**G. Robertson:** We are asking you? I'm not clear.

**R. Cantelon (Deputy Chair):** That wasn't quite my question. But....

**R. Austin (Chair):** If I may, just for a second. We're all adults here, and I think we in the room all understand that there is certain information that is proprietary that gives each company a significant advantage in the marketplace. If I may, I don't think that Mr. Cantelon was suggesting we put out proprietary information that would make all companies lose their competitive advantage, but I'll let Ron speak for himself.

**R. Cantelon (Deputy Chair):** Thank you, Chair, because that is exactly right. I think we've heard that industrywide numbers are presented, for example, in reports, but the environmental groups have more specific interests in sites with respect to sea lice and with respect to what the parameters are on fish health monitoring, perhaps even by site.

I guess I'm asking the industry if there is a willingness to be more specific in the detail they provide on websites and in central areas so that fears can be put to rest or legitimate concerns addressed if there are legitimate concerns.

**D. Blackburn:** Perhaps I'll respond to that one. I think it's a bit of a misnomer that the industry is not transparent. First of all, several years ago when this issue was raised, we put out a website. We listed every farm on our website, and we listed the exact number of fish we had on every single website. You can track and monitor that on a monthly basis because it's updated on a regular basis. We submit reports to the government, and an aggregate of those are put out.

[1015]

I've heard this question several times, and I would like to know: what is it that people want? They say: "We want you to be more transparent." Well, do farmers tell you how many cows or chickens they have in their barns? I mean, that's the detail to which we have been reporting.

There is a reason why we tend to guard things somewhat. As you've seen and witnessed, many people will take small pieces of information and use them completely out of context to harm our industry. We've borne the brunt of that several times.

Further to your question about how we get cooperation and how we work together, you people need to confirm without a question of a doubt that our industry is a viable industry — or maybe that's asking too much. I don't know. But we're an industry that's here to stay. As a producer, as a person who is responsible for over 250 employees.... They want to know that they're going to have a job next week, next month, next year. They depend on us to look after their livelihood.

When we see these unmitigated attacks against our industry with information that's often false and very poorly put together and that gets a lot of public press, we're somewhat reluctant to stand there and continue putting more information forward, because it gets used in the wrong manner. That was one of the fundamental criteria we had with CAAR. They accepted that our production in the area of question was solid. It was going to remain as we agreed. Once we had that understanding and we agreed to that, then we said: "Okay. We're going to open our books, and we're going to start working through things together."

If you can guarantee me that people are not going to take this information and use it to slam us, I think you'd find that you'd get even more information. But I'm really wondering: what more do you want, and why do you want it? If people can say exactly why they want the information and for what reason, and it makes sense, I think you'd find the industry very forthcoming. But I haven't really heard good reasons as to why they want the information. Don't you trust the government? You are the government.

**R. Cantelon (Deputy Chair):** Interesting rhetorical question. I had one short one after that.

**M. Walling:** I think maybe a couple of other members here wanted to provide a perspective.

**M. Martin:** My name is Moses Martin, Tla-o-qui-aht First Nation. If I may, I wanted to speak to a couple of the earlier questions.

Early in my mandate, back in May, one of the first meetings I attended was between the central region tribes and the environmental groups. They were all there — Sierra Club, Friends of Clayoquot Sound, Western Canada Wilderness. There were about six different environmental groups there. At that time I tabled a recommendation, something in the form of a protocol between first nations, industry and government so that we'd have some forum to address the issues that concern different people.

Up to this point I've only had one response, from Western Canada Wilderness, wanting to talk more about what I was recommending. I don't know. The central region board may be the vehicle to move something like that.

A second point that I wanted to speak to you about was for me and my tribe. It's very easy for us to say no if you don't have the proper information in front of you. To the point that Mary Ellen raises about high levels of unemployed people in our communities.... We're not quite that bad off. We're about 60 percent, but for me, in the position that I'm in, I have to look at

both ends. I have to look at the whole picture. I can't be creating employment opportunities on one end and then, on the other end, be cutting them off.

[1020]

**J. Henry:** Just regarding your question, Ron. Correct me if I'm wrong, but I think you're asking why the fish health information is aggregate and not site by site. Is that correct?

**R. Cantelon (Deputy Chair):** The broad issue is transparency. The need we hear here is more specific than across-the-board transparency.

**J. Henry:** I think that it's difficult for some information like that to come out for the general public. It's difficult for them to understand out of context. If they look at a site and see, for example, that there is one louse per fish on that site, that might seem like quite a bit if they don't have something to relate it to. If there was some benchmark to compare our fish health to something else — for example, the health of wild fish — then the public or whoever is looking at it could see that in context. What is the health status? What diseases are in the wild fish that are out there? Then you can compare that to the farms, and there will be quite a difference.

For our own company, in one aspect, we've done that. We've posted on our website our sea lice sampling results, and we have also posted some sea lice sampling results from wild fish, because some of that information is available. There isn't too much other health sampling going on, on wild fish. So we've compared that, and then we put.... Our sea lice levels for our coho, for example, are about a louse per 100 fish, and the wild coho are about 18 lice. So there's a huge difference. When you can put that in context, then we're happy to put our information out there. But on its own, it can be used in ways that it probably shouldn't be.

**R. Cantelon (Deputy Chair):** My last question. Mary Ellen, you spoke about the increasing competition from Chile in the U.S. market — that they're squeezing our market share continually. You also spoke about the need to process new applications in a quicker manner.

What will happen to the industry if we can't continue to move forward? I want to know what your projection or the industry projections are. If we don't continue to grow the industry, what happens to the industry in B.C.?

**K. Bullough:** As a general rule, industry that doesn't grow dies eventually. I don't know what you're looking for in terms of particular projections, because it's impossible to say until you give me some parameters to work with. But as a general rule, there is a desire to grow your industry, to become more effective and efficient and to remain competitive. Restrictions on that growth.... Ultimately, if those restrictions are no growth, eventually you hit the brick wall.

**M. Walling:** That would be the answer that I would give as well, but just maybe put it into the context of the international investment. Companies are making investment decisions about where they want to operate. We know that we're producing a great product. We have a competitive advantage because of our transportation costs being so much lower than, say, Chile, who have to either airfreight or produce frozen value-added product and then ship it into the U.S. market.

But that transportation benefit is not enough. You need to have sustained and careful growth. We're not talking about rapid growth. We're talking about managed growth, because you want that investment coming into the country, into British Columbia, in order to continuously improve practices, for example. If you don't have B.C. seen as a viable business investment opportunity, then companies are not going to be able to implement new technologies, as one example. What would be the benefit to that if your dollar could go further in a place like Chile or Scotland or Hawaii or Tasmania, which is where we're starting to see some of our workforce move to because of the limited opportunities for growth?

I think that's the other big piece of it too. We want to create an industry moving forward that provides opportunities for coastal residents. If they don't see that the industry is moving forward, then there's less incentive for workers to come into our industry, to stay there and to raise their families in coastal communities. That's a very important consideration as the population ages. We know that there's going to be increasing competition for workers. We're going to be competing with other industry sectors for workforce. I think that's another very important consideration and one that's not always considered.

[1025]

**C. Trevena:** I've got a number of questions, but I just wanted to carry on, on the economic issue for a moment. When you were talking about growing the industry, Mary Ellen, you mentioned investment in new technology and so on. But are we talking about growing with an increasing number of sites for farms, or are we talking about growing it in what we have and just finding new ways of doing what you have been doing, finding new ways of making it more profitable and doing it better?

**M. Walling:** Well, there are 12 applications currently within review for licence approvals — probably 11 now, because I think one of the Grieg ones was approved. Those are new sites. Those are considered new sites with new investment and opportunities going forward.

**C. Trevena:** Very briefly, you also mentioned aquaculture — I imagine finfish farming — in Hawaii and Tasmania. What fish is that that you're talking about?

**M. Walling:** Sea bream. There are any number of species that are being farmed down there.

**D. Blackburn:** Atlantic salmon.

**M. Walling:** Atlantic salmon in Tasmania. We have a number of B.C. residents who've moved to Tasmania to provide expertise while they're growing their industry down there.

It's very similar to what happened in Chile in the early days of the industry. When I looked back and saw the development of the industry, B.C. and Chile started at about the same time. As Chile expanded very rapidly, we saw a lot of people from British Columbia go to Chile to take advantage of the growing opportunities down there.

Brad's waving his hand down there. A number of my members — PR Aqua is one example — do quite a bit of work down in Chile.

**C. Trevena:** I find it interesting, because one of the things we're also looking at — and I wanted to move on to the Marine Harvest aspect — is that we are seeing in B.C. and worldwide a consolidation of the industry. I mean, Marine Harvest and Pan Fish are going to be part of Stolt shortly, at whatever stage....

Interjections.

**C. Trevena:** Sorry. It's the other way around. I apologize. It's the three.

I wondered. On this consolidation, you have three companies effectively going to become one company in the near future.

**K. Bullough:** Well, two have merged already. That happened a year and a bit ago, and Pan Fish and Marine Harvest will be merging in the near future.

**C. Trevena:** Which will make what were three companies a couple of years ago into one company.

**K. Bullough:** Yes.

**C. Trevena:** We're talking about competition internationally. Is there any indication that this consolidation of industry is going to create a net job loss in B.C.?

**M. Walling:** No. We have two of the heads of the companies right here at the table. Perhaps they'd like to....

**K. Bullough:** I don't know what Dale would like to say, but this is not a deal that is completed yet. We are still awaiting competition authority approvals from two jurisdictions. It is a global company, and there are competition issues that are being addressed in both Scotland and France. Until that time, we are still two separate companies, and we are under very clear direction about what we can discuss and what we cannot discuss until the takeover actually takes place and there's a common shareholder.

Unfortunately, there are some things we can discuss, and there are certain things we are forbidden to discuss. I don't think it's appropriate in this forum to discuss either of those things, to be perfectly honest.

**C. Trevena:** It was a more general argument, as well, that when you look at consolidation, you are often looking at a general job loss.

The other issue about consolidation is that we also have Marine Harvest having had the framework agreement with CAAR, which I think everybody has been talking about very positively. I was wondering about how this is going to move forward, both the consolidation and into the future, and whether this is going to carry on. Some of the things that are happening are very interesting. It's taken a long time to get there, and we want to make sure that we do get positive steps forward — whether this is also going to be part of the future.

**D. Blackburn:** It is our intention to carry the dialogue forward as we merge the two companies. We recognize exactly what you've said. It's taken a long time to get there, and we don't necessarily want to just throw it out the window.

[1030]

The other thing I think it's safe to say is that we are farming companies. We're committed to producing the fish that are in the system. When you asked about expansion, we're looking at a five-year plan, a five-year time frame from when we start selecting fish to take eggs until these fish get into the markets. You can't flip a switch and have 50 new farms next year or anything like that. Quite the contrary. The vast majority of our employees work in our operations, either in fresh water or salt water, and their jobs are all secure.

**C. Trevena:** My final question, I think, is more for Mary Ellen. The Norway trip earlier this year. There was a lot of enthusiasm when people came back and a lot of conversation about how there was good dialogue in Norway between the industry and ENGOs and how this was really a possible way forward. I wondered whether the Salmon Farmers Association would see itself in a position of being a representative of the industry to almost spearhead the dialogue happening with the ENGOs here in B.C.

**M. Walling:** It's not something we've discussed at the board level, so it would be something that we would want to talk about. From our perspective, we saw that the mayors, I think, got a great deal of benefit out of the trip to Norway. I wasn't able to participate in many of the meetings because I was moderating the AquaVision conference, which was a very interesting experience in its own right.

They travelled all around Norway, and in the Stavanger region they also met with their counterparts in the Greater Stavanger district. They had, from what I understand, some very good discussion and also had some very good discussion with World Wildlife Fund.

We participated over the past couple of days with the WWF salmon aquaculture dialogue, and I had found that process to be.... I think there are some useful lessons that we can take from that. Perhaps one of the lessons, just speaking without having the opportunity to talk with the board about this, is that I don't

think it would be necessarily palatable for the association to spearhead a dialogue in B.C.

I think that might be something that would be better done in a partnership, because I think that's what a dialogue is. It has to be a partnership where the groups agree that they want to have discussions and conversations together. We're open to that. We have limited resources, so that would also have to be something that would have to be taken into consideration, but we're always talking to people.

I think Odd wanted to add something and wasn't able to earlier.

**O. Grydeland:** I just wanted to make a comment on Claire's question about the job loss and the situation of growth in the industry in British Columbia. I think it's important to recognize that since the official moratorium was put on this industry in the mid-'90s, in periods of profit generation, companies in British Columbia generally wanted to invest in new production. They wanted to grow the business, and I think that's still the case.

The only way that companies could have grown in British Columbia, in general, over the last 20 years or at least 15 years is to buy other companies. A result of that is taking advantage of some consolidation and so on. There's no doubt that there has been some reduction in workforce in those types of situations, which in part has led to some of the key people in the industry leaving for better opportunities elsewhere, as Mary Ellen pointed out.

I think it's fair to say that most companies, at least historically, would like to grow by increasing their production in the form of new sites, which indeed would then lead to more jobs, more opportunities for everybody. I'm not speaking for the companies that are here today and going through their consolidation. But certainly, historically companies would like to grow by increasing production in the form of new sites and hiring new people here in B.C. I think that's how we'd like to move forward as well.

**C. Trevena:** I'm obviously very cognizant of the need for jobs in coastal communities, as many of the areas represented are in my constituency, and we definitely do need the jobs and investment.

[1035]

If I can come back very briefly, Mary Ellen, to talk about partnerships. When you say partnerships, would you see that it would be each part of industry forming those partnerships with the ENGOS? Or is it something that you as an association — if you took it to your board, obviously — would feel comfortable taking as working equally with the people you're having the dialogue with to try and build up those partnerships? Or would this be a specific company-based partnership?

**M. Walling:** Well, I guess it would depend on what was wanted to be accomplished with any kind of a partnership or a dialogue. I think the association's role is really to facilitate opportunities for the member companies to have these kinds of exchanges. If it's

meant to be, for example, research collaboration, which requires access to sites and some specific expertise and technology, then sometimes it works out better to have that partnership directly with the company. If you're talking about partnership in the sense of a business relationship, of course, then, that would be most appropriate to be a partnership between, say, a first nations community and a member company.

I think it would depend on what you were meaning by "partnership" and, also, what the appropriate role for the association would be in terms of facilitating that dialogue. At some level, if decisions are being made that affect the companies directly, they need to be involved and participating.

**C. Trevena:** My final one, Mr. Chair, if you'll excuse me on this one.

You mentioned in your previous answer that the Salmon Farmers Association has limited resources. Are you funded by your member companies? Is that how it works?

**M. Walling:** Yeah. We're funded by our member companies. We have 72 members, and we have a dues structure that recognizes the size of the different companies. That's how we're funded. We get a limited amount of money from the provincial government for our partnership around the fish health database. I think that last year it was \$17,000. But we're funded by the membership.

**G. Coons:** Thank you so much for coming here today. I just want to hit on something that Ron was talking about in the transparency. Again, being on this committee and doing the background research on why we're here and how we got here.... It seems like we're just going full circle ever since, as Odd said, the moratorium and the environmental assessment review and the *Salmon Aquaculture Review* recommendations.

If I look back to an information bulletin in '97, it says that adverse impacts were found at some sites, and some gaps remain, but impacts are low and could be further reduced with careful management and better information. But the recommendation priorities were to strengthen public participation, develop some aquaculture code of practice.

Issues like that — again, strengthening public participation — I don't think happened from the recommendations. And who's to blame? I don't blame the industry. Again, if I have to blame somebody, I'd blame us — the government — for not being stringent in that. We start looking at the opportunity for first nations and community organizations to be involved, and that was lacking. We see that happening right now with the concerns of first nations.

The code of practice. I believe the code of practice was supposed to be developed with input from all key interests, including first nations and communities. What developed was the voluntary code of practice by the salmon farming industry.

I think that comes into the transparency, where the public, first nations and communities want the information,

and it's lacking. That's just my comment on that, and you can comment on that in a minute.

I do have some questions here. I have a briefing from the Minister of Fisheries, Hon. Hearn. You were talking about escapes, and DFO says: "Data for the last five years show a steady decline of Atlantic salmon escapes. Escapes from B.C. fish farms now represent only 0.3 percent of total harvest."

[1040]

I'm wondering: as far as British Columbia, what's the total harvest of fish? DFO is saying 0.3 percent is the escape rate. For me, in my mind, for every million harvested, 3,000 are escaping. If that's not what is happening.... This briefing report was June 12, 2006. First off, what is the harvest rate in British Columbia?

**M. Walling:** You mean the total harvest last year?

**G. Coons:** Yeah, the total harvest rate.

**M. Walling:** I don't have that figure right in front of me, but 72,000 metric tons. Do you want that extrapolated into the actual number of fish?

**G. Coons:** Again, that's a briefing that I got from the minister, where it says 0.3 percent of total harvest. That means that for every million fish harvested, there are 3,000 escapes. That information is very critical when the industry says: "Well, at our sites for every one, two or ten fish, it's reported." We have DFO, on the other hand, indicating different numbers. It comes back to transparency and the dilemma of that. That's something I would like to know — to get it transferred to fish.

If there is a conflict, then the industry and governments and concerned people need to get that information out there. That's where we have the mixing views.

**M. Walling:** I suggest you take that up with Minister Hearn and Minister Bell.

**G. Coons:** Well, we did.

**M. Walling:** What I can tell you is that we report every escape. It's a condition of our licence. The workers take this very seriously, and we report every escape.

**O. Grydeland:** If I can maybe add a quick comment to that. I think this is one area that the industry has provided transparency. Like Mary Ellen says, every fish that has escaped, that has been found to escape or that even has been suspected of escaping, is reported. Those numbers are available on the government's websites. The findings and numbers of farm salmon that are caught in the wild are readily available.

The number of fish that are produced and harvested in British Columbia.... Although the exact number of fish may not be available — although they may be, I'm not sure — it's very easy to take the 72,000 tonnes of fish that are produced in a year and divide by an average of five kilos, for example, and do that calculation.

With respect to the reported numbers, like I said, that information is there for everybody to look at. Those numbers have, in general, as you mentioned, gone down over the years. We have had reports of considerable escapes in the past, especially before the new regulatory regime around escape prevention came into place.

In one year you can have 4,000 fish escape, and the next year you can have four fish escape. What Minister Hearn is perhaps talking about is sort of an average over a period of time. I certainly can't say that you can state with any kind of accuracy that in any given year 0.3 percent of the harvested fish has escaped. It varies a lot. By and large, I think the industry needs to be commended for its job, again, to get with a regulatory regime in reducing the incident of escapes.

**K. Bullough:** If I could just interject. I thought that at first you said 0.03 percent, and then you said 0.3 percent.

**G. Coons:** It's 0.3. That's what it says in this briefing report.

**K. Bullough:** Okay. I'm not sure where the minister has come up with that. What time frame he's using, I have no idea.

**M. Walling:** Is he averaging it?

**K. Bullough:** I would suspect that this past year there were anywhere from ten to 11 million harvested fish, possibly even as high as 12.

**G. Coons:** Again, we found out yesterday about closed containment activities with governments that we didn't know about. But also, there are letters of understanding between DFO and B.C. to better coordinate regulatory activities. There are also two other letters of understanding that relate to first nations and the consultation process and the approval process for production increases on existing aquaculture sites.

I'm just wondering if you've been informed of any letters of understanding between DFO and B.C. on the approval process for production increases on existing sites at all — if you're aware of those LOUs.

[1045]

**M. Walling:** What I can say is that there's been a lot of discussion between the provincial government and the federal government about harmonizing their practices because, from the industry's perspective, there does seem to be a considerable amount of jurisdictional overlap.

Of course, British Columbia's provincial regulations are much different than the regulations in New Brunswick, as an example, where — to pick up on your escape piece earlier — reporting escapes is actually not mandatory in that province. There's a great deal of difference across the country, so my understanding is that the province and the feds have been working together to, where possible, achieve some efficiencies

in how they are actually providing oversight to the industry.

Those letters may be part of that discussion. I don't know. I'm not privy to them.

**G. Coons:** My last comment is that yesterday we attended the DFO state-of-the-knowledge presentation.

Mary Ellen, you mentioned going through a literature review.

Going through this, you just see all of the knowledge gaps and the research gaps that we haven't reached yet, even back from '97. Again, even when we look at the research done by DFO, the research priorities are a key into all types of areas. I'm sure you've gone through this research.

I think it would be really difficult to even sit down and review the literature, because there are so many gaps in siting and the impacts of wastes and the impacts of chemicals, as the state-of-the-knowledge report indicates. They indicate that it's going to be years and years before these gaps are filled.

**M. Walling:** I think that the comment I was making was specific to a literature review around closed containment. I think it's very evident in every human activity that there are going to be gaps in scientific knowledge. As aquaculture is a relatively new industry, globally and here in British Columbia there are gaps that need to be filled.

We fully support additional research as we learn more about the marine environment. But the whole area of oceanography and marine biology is a very large area, and I would say that in our understanding of the wild fishery, as well, there are some real limitations.

I think one of the positive things about having an aquaculture industry that has been so successful here in British Columbia and, indeed, across Canada is the work that we've done to establish the national aquatic animal health program. That's going to provide, I think, some really good information about the wild fishery and, also, about salmon farming, because the scientists will be able to take many of the technologies and many of the research models that we've developed around salmon farming and apply those to the wild fishery.

There has been an investment by the federal government, through the Canadian Food Inspection Agency and Department of Fisheries and Oceans, into the NAAHP. We're going to see that unfold here in B.C. shortly, so you may wish to pursue some questioning of the federal government and CFIA about how that's proceeding.

Also, I understand that a number of the veterinarians from B.C. are going to be serving as part of that program. I think there will be some very good information that comes out as a result of that.

**G. Coons:** Thank you so much.

**J. Yap:** Thanks for your presentation. I want to get back to the question that keeps arising regarding closed containment as, potentially, the saviour here. What I'm

hearing, then, is that technically there are a lot of questions about feasibility. The main question from.... You're all business people. Economically, there are serious questions. To summarize it, is it basically that as much as it may sound like a solution, the challenges technically — and, fundamentally, economically — make it very difficult to pursue closed containment?

**M. Walling:** I think that even more challenging than answering that question is: what is the definition of closed containment? When we first started the discussions around closed containment, it was land-based. These would be large facilities that would be constructed on land. You would be somehow pumping salt water into a large land-based facility, and then there would be some decision about what to do with waste. That has kind of evolved.

[1050]

Then there's discussion about sea pens, similar to the technology that was trialled by Marine Harvest down at their Saltspring site using the Future SEA technology but not managing waste, not treating waste and not disposing of waste.

For us, I think that's the fundamental question: what do you mean by closed containment? If you can give me an answer to what you mean by closed containment, then I might be able to provide a better answer about the broader question you're posing.

**J. Yap:** We've heard some commentators say the first definition of closed containment on land, and we've also heard the other. I guess there will be two parts to your answer, then. With regard to the first one, where some have come before us and said, "Put them on land," what's the response to that suggestion?

**M. Walling:** Well, we already successfully grow our fish in land-based facilities for a great part of their early lives. That's what our freshwater hatcheries are designed to do. Then the fish finish out their lives — the salmon specifically; I'm not talking about the sturgeon at Target Marine — in the sea pens before harvest.

I think that for us, closed containment raises at least as many environmental issues as it purports to solve. So when you're talking about a land-based facility, I think the best presentation that I've seen on this through the committee process was the one that was given in Campbell River. The fellow's name has gone completely out of my head, but he has done quite a lot of work in closed containment....

**B. Hicks:** John Holder.

**M. Walling:** John Holder.

We're all concerned about fossil fuels. We're concerned about greenhouse gas. We're concerned about the hydro that would be needed to rear 70,000 metric tons of salmon in a land-based facility. I mean, I just don't know where you would do it. I just don't know how that could be physically achieved. There's nowhere in the world where that technology is being employed to grow salmon.

In terms of the technologies that were trialed by some of our member companies around Future SEA, they had some success with those technologies, but I think the costs were about 30 percent higher, if I recall that correctly.

Justin, you've had good experience with closed technology. Perhaps you'd like to add something.

**J. Henry:** I'd just like to comment on the closed containment because we have some experience rearing fish on land, as Mary Ellen pointed out, for a great deal of the life cycle of the salmon. For most companies they're reared up to a year or more at a land-based facility and then go out to sea for one to two years.

We've cultured in a land-based, recirculating facility chinook, Atlantic salmon smolts as well as white sturgeon, which we're growing up to large animals now. Some of the larger animals in that system now are 70 kilos to 80 kilos. We find that our production costs are quite similar for a 70-kilo animal and a 100-gram animal — the cost per kilo of production. That cost is about \$10 per kilo more than we can sell our fish for. So someone has got to pay the difference, and I don't see anyone paying that.

**J. Yap:** So economically, it's not feasible.

**J. Henry:** With the technology that we're using, that's right.

**J. Yap:** Okay. So that was the answer on land-based. With regard to a water-based closed containment, it's basically the same situation — technically and the feasibility?

**K. Bullough:** I don't know a lot about the Future SEA systems. I did see them down in Saltspring. They would be a challenge to operate in some of the more exposed sites that exist on this coast. I would be concerned that they would be likely to tear the netting, and therefore, we could be attempting to solve one problem and just creating another.

There are challenges, and I'm not certain the technology is there for all locations. While that technology may work at one location, that doesn't mean it will work at all locations.

[1055]

**O. Grydeland:** I think the technological challenges can certainly be addressed. There's a lot of land-based aquaculture going on all around the world for different species, but as Justin pointed out, you need to produce an animal that can fetch somewhere in the \$7-to-\$8-a-pound range in order to make that type of an operation viable.

The main point I wanted to make — and it was mentioned by a committee member earlier — was about the establishment of performance-based standards. I think if we go the route of establishing the parameters under which salmon farming or any other type of aquaculture can be carried out in British Columbia.... The World Wildlife conference the last couple of days talked about that as well.

If you establish acceptable parameters — in other words, an acceptable level of impact which we have here in British Columbia with respect to waste issues around salmon farms — and have a good control system, leaving it up to the operator to meet those parameters, I myself think that would be a healthier approach than to start looking at a prescriptive method of operations.

**J. Yap:** Which I understand is not being done on any large scale anywhere in the world, as far as salmon farming is concerned. Is that correct?

**O. Grydeland:** Yeah.

**J. Yap:** Nowhere? Whether it's in Norway or Chile, there is no closed containment being done?

**O. Grydeland:** No, not to our knowledge. There is some experimental trial being discussed in Norway at this point.

The biggest attempt at growing salmon in land-based facilities was up in Iceland, where a number of years ago they were pumping out filtered, warmed-up seawater from the ground around the coast. I think there were about 12 operations attempted up there in its heyday, and they all, one after another, have failed. Some of them have converted to grow different species, like rainbow trout, which you can grow at three times the density of salmon. One operation has switched to growing abalone. But as far as the Icelanders are concerned, there is nobody up there today that is making any money on growing salmon in these land-based facilities — even, as Mary Ellen pointed out, with no waste treatment or pathogen control.

**J. Yap:** Shifting gears a bit here, Mary Ellen, in your presentation you talked about collaborating or working with the culinary industry. The product that you produce is known for quality, for freshness, for nutrition. These are, I think, the hallmarks of your product, and you have a huge market in the States that takes whatever you can produce.

Do you sell some of your product locally in British Columbia? I'm lucky enough to go to different restaurants, and every time I look for salmon, it specifically says "wild." I'm wondering where you are with the culinary industry in terms of supporting your product.

**M. Walling:** I think that's been one of the real challenges. One of the things I've been the most concerned about is that this polarized debate has created this situation where retailers are targeted by people who object to them selling farmed salmon. So I think there's some difficulty in being able to be very visible and very vocal about it.

I will say that there are a number of places where the retailers and the restaurants are proud to offer their customers a choice. We know that wild salmon tastes great in season, and it's available. I personally love the taste of wild sockeye, and I'm lucky enough to get it

from some of my friends when they go fishing. But during the rest of the year we're producing a product that's fresh year-round, and so I think there are some natural, real synchronicities that we could be really working on collaboratively together.

[1100]

Also, in the shellfish industry we have a wild shellfish industry, but we've got a fabulous farmed shellfish industry as well. When I was in Norway.... That's one of the things they do very, very effectively. They just talk about the benefits of eating seafood, how good it is for you, how tasty it is — and by the way, do you want to try some of this great Australian wine? That seems to be the wine right now in Norway. They just promote the heck out of it. They have centres where they've established facilities where they're training people in the very latest processing technologies, for example.

In our capture fishery, you've got a certain amount of product coming very quickly into the processing facilities. A lot of it goes into cans or is frozen, so that's not necessarily the highest and best use of that product. In our industry we have processing technologies where we can fill it and provide all kinds of value-add. You know, companies like Walcan, for example — which many of you visited — are processing both wild and farmed. You can take advantage of the benefits of both.

Rather than give you a list of restaurants that I know are serving farmed salmon or serving wild salmon or serving both.... To me, that is where the government could play a real leadership role in saying: "Look, we've got the best seafood in British Columbia anywhere in the world, and we've got the most variety of it." So why don't we just try and move that forward? That is the message that I think consumers should be getting.

The health benefits. When I was in Norway listening to Dr. Rimm from Harvard School of Public Health, I think one of the things he said was that you could live 17 years longer if you ate salmon two to three times a week. He's not differentiating between wild and farmed.

That's a pretty significant finding. You know, you're lowering risk of coronary heart disease by 30 percent, Alzheimer's, and on and on. I mean, we should be encouraging not only the U.S. market to eat more salmon but people in Canada, in British Columbia.

**J. Yap:** What is your knowledge of the culinary industry that is buying your product in the States? Do they differentiate between farmed versus wild?

**M. Walling:** It depends on where you're selling the product, the different kinds of markets. I went to Calgary about two years ago. My husband was working, and I went to join him for the weekend. I always order salmon, and I asked if it was farmed or wild salmon. She said: "It's farmed. Isn't it great?" So obviously there's less sensitivity around it.

Vancouver is a very sensitive market because of the actions of some of the ENGOs saying that it's not a healthy product or that it's not safe for you. They've been very active. You can go into some of the sushi restaurants. In the bathroom there's a terrible picture of

all the things that are going to happen to you if you eat farmed salmon.

But in the middle part of the U.S. there certainly isn't the sensitivity. I was in Miami a couple of weeks ago. There isn't the sensitivity in places like Chicago. People just want the product.

**J. Yap:** Right. I'm kind of leading up to my question regarding — and we've talked about this before — the messaging and the communication. What is your association doing to promote your healthy, nutritious product? Clearly, it's a product that you're not ashamed of. What kinds of programs do you have to say that this is a good product, this is healthy and nutritious, and we should be embracing this product?

**M. Walling:** Well, there are a couple of tiers to it. Part of it is the work that we do here in British Columbia, participating in shows like Eat Vancouver, for example, and the retail Foodservice Expo. It's not because we need to build a bigger market for the product. We can't supply the demand that we've got right now. It's more to provide a direct-to-consumer contact so that we're able to talk to people and have people link directly with the farmer, for example.

One of the other things that has been hugely successful for us this year is that we opened our farms to the public every week from June to September, which is the nice time to go out on a farm. For those of you who travelled to Klemtu in November, I share your experience and have travelled to some of those communities in that kind of weather. But what we did was advertise in the tourism publications. We said: "Come on and visit us. We'd be delighted to take you out."

[1105]

Every Thursday was tour day, and we had a number of our member companies open the doors to their farms. We had a water taxi pick people up at the dock. We took them out to a farm. We toured them through the farm. They could ask any questions they wanted, go entirely through the farm. We fed them lunch on the boat and took them back through Hole in the Wall on Quadra Island, which is such a beautiful boat trip, and then through the processing plant. We did that every Thursday from the beginning of June to mid-September, and we were sold out every week. We had waiting lists for many of those tours. So those are some of the things we do locally.

In terms of the actual market development, many of the member companies have their own sales and marketing arms. They develop programs and activities to promote the product in the marketplace. Also through Salmon of the Americas — which is a trade organization that represents Canadian, American and Chilean producers — they do quite a lot of marketing in trade publications and women's magazines, talking about the benefits of eating salmon.

The other thing I would just like to add is that we talk about eating salmon because it's a healthy food choice and because we think it celebrates the best of British Columbia. We don't differentiate in our messaging

about wild and farmed. For example, I don't mean that we're not proud of our own product. We are very proud of our product, but we don't get pulled into the debate about which is better for you.

We think that British Columbians, Canadians and people in the States should be eating more salmon. We would prefer them to be eating B.C. salmon, not Alaskan salmon, so that would be the message we would put forward.

**J. Yap:** One of our mandates as a committee is to ensure that we have a sustainable aquaculture industry as well as, at the same time, recognizing and ensuring that it works well alongside the wild fishery. I think you made some reference to the wild fishery in terms of your associations and linkages. What is the relationship with the wild fishery in terms of your association and the wild fishery folks?

**M. Walling:** The makeup of our industry is much different than the makeup of the wild fishery. They don't necessarily have an organized group.... With association to association, you can have those kinds of discussions. If you're talking about my neighbour Terry who lives two doors down from me and is a commercial fisherman, there are lots of those kinds of community linkages.

In terms of the recreational fishery, there are strong linkages between the association and our member companies with the enhancement facilities up and down the coast. We provide a great deal of equipment, expertise and feed donations — that kind of exchange. That's very connected.

I speak regularly with Christina Burridge from the Seafood Alliance. We stay connected in order that we're able to provide them with information, and they provide information to us. In terms of a coordinated approach to some discussions with the wild fishery, that's not in place.

**J. Yap:** But you did say in your earlier comments that you enjoy wild salmon. This is what we want to see as a committee — the two continue to thrive. The two sides are, to use that reference.... Your industry and the wild fishery — are you at a steady state, supportive to each other, or what? How would you describe the relations?

**M. Walling:** I think it's a nuanced discussion. Of course, the downturn in the commercial fishery has happened over a long period of time, and with the conservation mandate for the Department of Fisheries and Oceans, in some circumstances catches have been limited. The commercial fishery can't meet the demand for their product, and we can't meet the demand for our product.

The solution would be for the commercial industry to value-add their product and for us collectively to brand the product to get a higher price. Also, we know we can expand our production, whereas with the capture fishery there are catch limits. We see that all over the world, and certainly we see that in British Columbia.

[1110]

We're also looking at a situation where we're seeing changing ocean conditions. We have more flexibility to

respond to changing ocean conditions because we have control over the product. We can adjust. We can adjust feeding. We can move the farms. There are things we can do. But the changing ocean conditions are having.... There are a number of effects we're seeing now that may have implications for the capture fishery. So I think that's something else that makes it a more nuanced discussion.

**J. Yap:** Thank you.

**S. Fraser:** Thanks very much for coming here today, all of you — for helping us in wrestling with our mandates, wrestling with science or conflicting scientists and balancing that with community values, jobs, protecting the environment. That's why we've done 25 or 30 different site trips of various types and visited communities involved.

Your organization is the lead, I take it. B.C. Salmon Farmers Association is the lead representative for the industry in B.C. You mentioned 72 members, I think. Can you tell me: am I correct that you are the lead representative? You represent the lion's share, I assume, of the industry. Is that correct?

**M. Walling:** Yes, we represent the major companies — the major farm companies, feed companies, processing facilities, and the supply and service side of the industry.

**S. Fraser:** Are there people that aren't members, who still have fish farms — companies that are not members?

**M. Walling:** Yeah, I think there's one, maybe two. Totem Oysters is not a member. It's a small operation. And Yellow Island is not a member.

**S. Fraser:** But you represent everybody. You still have by far the majority.

**M. Walling:** Our membership list is available on our website. You can just go, and it's broken into producers, feed companies, processors, and supply and service side of the industry, with links to those companies from the website. You can get that complete list there.

**S. Fraser:** I just wanted that in *Hansard*. So when you're speaking, you are representing by far the lion's share of the industry. I appreciate that.

When we're doing our tours, we hear various sides on these things. There are some communities that are very supportive of the industry and some that are not. That's first nations and non-first nations.

The relationship that the Tla-o-qui-aht has with Creative Salmon is one that I think has been a good agreement. I know there's been quite a bit of give-and-take there as far as the community goes. There's been controversy within that community too, but Creative has mitigated a lot of that — farming Pacific salmon with chinook. And I don't believe they use foulants on their nets. So there are a number of things being done that I think have actually helped make that relationship work.

There are certainly a lot of first nations along the coast that we've met, who do not have as much support or any support for the industry within their traditional territories. We've also got non-first nations communities where there are resolutions that have come out of the UBCM. There's caution there, at least, with the industry.

We hear these things, and we have to try to balance them. How do you, as the association representing the industry or your members, deal with those...? If you've got communities, first nations or non-first nations, that are resisting your industry, how do you deal with that as an industry? Do you have a policy for that?

**M. Walling:** No. Our goal is to provide information to people who want to understand more about how we are farming salmon in British Columbia. It's very difficult in a community like New Hazelton or Terrace, which will never really see a social benefit, to be supportive of an industry that has no effect on them.

I know there's been a lot of concern raised on the north coast about the industry, but what we see is that in communities where we are operating, there is a much better understanding of the benefits of the industry, possible impacts of the industry. There's much more of a balance.

You say that there's not agreement, necessarily, or that there are differences of opinion in the Tla-o-qui-aht Nation. I would say that there are differences of opinion in every single venue you go to — in your own families, in your own organizations. Within our organization there are differences of opinion. I think the challenge we face is how we move this to a more respectful discussion.

[1115]

I was very disappointed at the resolution from New Hazelton at the UBCM. Despite a number of calls to that community, I've yet to receive a return phone call. We've offered tours and offered to provide information. I feel that sometimes these issues take on more of a political context, and that's unfortunate.

From an association perspective, we're always happy to speak with people, take them out on a farm tour and provide them with information to assist them to make good decisions.

**S. Fraser:** I appreciate that. Of course, the UBCM is a political organization, so....

**M. Walling:** Not surprising that they would have a political resolution.

**M. Martin:** On the issue of closed containment, for us as first nations it begins to raise other issues such as treaty — how much land is required to maintain the current levels of production and how much land is required to treat water before it's pumped back into the ocean.

Scott, on your comment on our relationship with Creative Salmon. We continue to build on that. Currently we're looking at a joint venture proposal on a

landing barge and maybe on another species of fish as well.

**S. Fraser:** Thanks, Moses. That's good to hear. We saw in many ways a similar relationship at Klemtu Kitasoo. It's interesting to see the agreements that have happened, where it has worked when first nations and the industry have come together. We've tried to look at those relationships and continue to see if there's some model there. Every situation is unique.

If I could, the economic development in the communities. The payroll you referred to in your presentation, Mary Ellen.... Obviously, the jobs are a key part of our deliberations on this. We're mindful of jobs and environment and trying to balance that.

I think Grieg was the example. You mentioned over a \$2 million payroll. I can't remember. Where was that from?

**M. Walling:** In Gold River.

**S. Fraser:** Did you say that close to 25 percent of that was within the community? Where was the rest of that payroll going, if it wasn't within the community?

**M. Walling:** Well, not everyone who works on the farms in Gold River would necessarily live in Gold River. Some people live in Campbell River, so that would be where the rest of it would go. Some people commute. Actually, my son Neil lives in Campbell River and works at a farm at Atrevida Point for Grieg Seafood.

**S. Fraser:** I hope he didn't have to commute during any of this.

**M. Walling:** He actually got stranded there when the road washed out, so there was great discussion in our family about how they were faring in Gold River. I'm glad all is well there now.

**S. Fraser:** Just one last, if I may. You mentioned several times in your presentation about the issue around world food needs and the significance of the industry revolving around that. As we see an increasing population globally, which we're growing very quickly, that's obviously a concern. Is any of this product making it to Third World...?

Both B.C. and Chile are vying for the market in the United States. But when you hear about world food problems, usually you associate that with Third World countries and the poverty and hunger that go along with that. Is any of this product being marketed or supplying that need worldwide?

[1120]

**M. Walling:** Well, our product doesn't just go into the U.S. It goes into Asia, China, Japan, India and other parts of the world. Our challenge is that we can't grow enough product to meet the demand for it. That's the biggest challenge facing us right now.

Some may say, of course, that that's a great situation to be in. Salmon prices are very high right now,

and you can't meet the demand for the product. But it does create a challenge for us because we are very dependent on the U.S. marketplace. We're subject to fluctuating currency rates. Also, it doesn't allow us to diversify our market. We're not able to take advantage of the growing populations and growing middle class in a place like China, for example, where we could very easily be exporting product out of Prince Rupert. That's a challenge that we face.

**S. Fraser:** Just to follow up on that. What percentage of the product is going to the United States from B.C. at this point?

**M. Walling:** Off the top of my head, I would say probably about 85 percent.

**S. Fraser:** In the competition here with Chile and trying to capture that, how much do they have? Do they have a larger percentage going, or are they able...?

**M. Walling:** Into the U.S.?

**S. Fraser:** Yeah.

**M. Walling:** Yeah. It's a big market for them. I don't have the figures right with me, but off the top of my head, they probably produced 670,000 metric tons. Almost 500,000 of that would have gone into the U.S. market.

**S. Fraser:** Obviously, they have lower costs, or I assume they do from what we were talking about earlier. Is our competitive edge our proximity to that market?

**M. Walling:** They wouldn't necessarily have lower costs. They have more product. They have a lot more product.

Our competitive advantage is the proximity to the market, because they are having to ship it through Miami. They're air-freighting fresh product, which is part of the reason why their growth in the value-added has been so great for Chile — the fillets, for example. They don't want to be shipping product with any waste on it. So they're doing a lot of value-added work in Chile.

**G. Robertson:** My first question is related to your recommendation around maintaining the most stringent regulations. I think what the committee has heard for many months now is that the public perception is that we do not have the strictest of regulatory schemes.

If you compare jurisdictions on paper, depending on how it's presented, it may look like we do. But we have a challenge out there among the public that our regulatory regime is not all that strict, particularly given the context that we have 50-odd million wild salmon on our coast and the other jurisdictions don't have that same interaction and competition between industries.

Given that, what do you propose in terms of...? If you say just maintain that, I think most people would contend that maintaining these regulations is not going to cut it with the public. Do you have suggestions on

how we improve the situation overall in terms of how the public perceives our regulatory regime?

**M. Walling:** I think that is something for the provincial government. The provincial government needs to communicate what they are doing to regulate our industry.

We're the most heavily regulated food industry in Canada. We've looked at the comparisons of the regulations across the jurisdictions, and we also have linkages to the international companies. So we know from our discussions with our colleagues what the cost of operating a business in British Columbia is compared to another jurisdiction, because of the regulatory burden.

If the public is not aware that we have the most stringent regulations in the world, then that is the role for the government to be able to describe how this industry is managed and regulated. That's the government's job. Our job is to follow the regulations and do our very best.

**G. Robertson:** Are there any specific regulations or potential regulations that you think would help in terms of this overall challenge of public perception? Are there regulations that are missing or not emphasized enough?

[1125]

There have been efforts historically to support the industry and to communicate that there are robust regulations in place. Are there others that the industry thinks should be emphasized or brought into play, or is it purely a communications challenge?

**M. Walling:** Well, because we are the most heavily regulated food industry in Canada, it remains, I think, the responsibility of the government to be communicating how they are regulating the industry. Which aspect of the regulations they wish to emphasize would be a decision that would be taken by the government.

**D. Blackburn:** If I may say something on the regulations. A typical example is that the net-breaking strength we use — the strength at which we discard our nets, in other words; they are five years old, sometimes a little older, sometimes not quite that old — is the strength to which Chile builds their nets. We are considering sending our used nets down to Chile to try to recover some of the money, because our used nets are built... We are discarding nets at the same strength Chile is building new nets to.

That's an example of the regulation. If the public doesn't know that, I will accept responsibility, because we haven't done a good job of communicating that. But I think you as a committee have to speak to some of these things, and it would behoove you to inform yourselves of the regulations. That's one example.

Mr. Yap asked how much we are doing towards communicating the benefits of eating salmon. Mary Ellen, I think, was very humble in that she has put in an incredible amount of time to make sure our industry is not totally blindsided in hearings like this, in holding people accountable. She, in comparison to the other

organizations, has a very minor staff and a modest budget. We're stingy. We don't give her a lot of money, but that aside, she does a remarkable job.

When we're busy attending hearings like this, we're not doing the collaborative work that we could, by which everyone in British Columbia would benefit. That's the area that people have to take. We shouldn't be focusing on the 36,000 fish that may have escaped last year. When I tell these numbers to my colleagues in Norway, they laugh. They say: "You don't have a problem. What are you worried about that for?" We have to look at things in perspective and try to gain a bigger picture of what's really happening, what the important issues are.

The important issue is that we've got a country that's terribly obese and has terrible eating attitudes, and we're saying: "Don't eat farmed salmon. Eat wild, because we want to save the wild." I mean, does that make any sense? That is a rhetorical question.

**G. Robertson:** Maybe to segue from that comparison and Norway's lack of a challenge in terms of public perception, I was in Europe in the summer and was surprised by how different the perception of farmed salmon is there. Norway's approach to having part of their coastline off limits for salmon farming and fish-farm-free fjords clearly has been a differentiation and, to some degree, an acknowledgment that they have maintained some of their coastline to prevent any possible impact on the wild fishery and wild ecosystems.

What is the Salmon Farmers Association's position on taking a comparable approach on the B.C. coast and keeping some of the B.C. coast fish-farm-free?

**M. Walling:** I think when you talk about the fjord example.... You know, I must say it is unfortunate that not one member of the committee was able to attend AquaVision and some of the meetings that were held there, because we had a very good presentation from a number of the people in Norway on the fjord situation there, which was very useful.

[1130]

In terms of having areas of the coast that have no salmon farms and areas of the coast that are marine-protected areas, I think these are very different kinds of examples. My understanding is that in Norway, because of development pressure and other issues facing the wild salmon in Norway — which is a very different context than British Columbia with, for the most part, our abundant stocks — they have designated some areas that have no development.

I think it's important to really dissect what we're saying. If you're saying, Gregor, that there should be some areas of the coast that have no aquaculture, what do you say to the other pressures that are facing our wild stocks from forestry and from land-based agriculture?

You know from my earlier introduction that I lived on a dairy farm for 25 years. There are a lot of impacts that come from land-based terrestrial agriculture, from urban sprawl, from water use, from our situation in Tofino this year with the limited water in the reser-

voirs. I mean, these are all factors that affect our wild salmon. To single out an industry and say, "We don't want you in some part of the coast," and then to allow all of the other activities to occur, including catching the fish and killing them, does not make a lot of sense to me.

I think it would be useful, if the committee is considering some of that approach, to inform yourselves very specifically about what they are doing in Norway around the fjord closures and also to recognize that the industry in Norway is ten times the size of the industry in British Columbia.

**O. Grydeland:** Maybe I can just add a little bit to that. As Mary Ellen touched on before, the situation is quite different here in British Columbia as compared to Norway. As you know, in Norway they are farming the domestic species of salmon — the same type of salmon that goes up in the rivers. One of their main concerns in Norway is the intermingling of escaped farmed salmon in the genetic pool of wild salmon.

A very good returning year for wild salmon in Norway would be maybe 500,000 or 600,000 fish. As you pointed out, in British Columbia we're looking at wild salmon stocks in the 30 million, 40 million or 50 million numbers. So that's another reason you've got to look at this from the context in which these initiatives such as the salmon fjords have been initiated.

I think it's also important to remember that the provincial government — I think it was under the NDP in 1999 — established their action plan on salmon farming in B.C. as a result of the recommendations that came from the salmon aquaculture review process. One of the recommendations was to look at the existing salmon farmsites in British Columbia — their siting, their locations, the appropriateness of those locations — and identify those sites that were deemed to be in unacceptable locations for environmental, among other, reasons.

We did go through the process of relocating a number of sites that it was agreed should be moved. So whereas Norway, in establishing the salmon fjords.... The general concept is that the bulk of those salmon farms in those fjords today will be allowed to stay. There will be a restriction on increased production from those sites. There will be limited opportunities or no opportunities for new sites to go into those areas. Also, there will be some additional requirements with respect to escape prevention, for example.

Again, my main point is that you have to look at these approaches from within the context of the local environment. I think that we in B.C. have done a good job in looking at that and have addressed that issue already.

**G. Robertson:** A question on feed. One that has been raised repeatedly is the concern about where the ingredients of that feed are coming from. We have heard reference to initiatives in Scotland around Marine Stewardship Council-approved fishmeal and fish oil. Are there any efforts in the works to look at sustainably harvested fishmeal and fish oil in the industry here in B.C.?

**M. Walling:** I'll let my feed guys answer that. [1135]

**G. Deacon:** Greg Deacon, from Skretting. As a company, we have a policy of only buying fishmeal from sustainable fisheries. Most of our fishmeal comes from Peru. In fact, they have an active management system where they manage their fisheries to make them sustainable. That's the situation.

We do use some fishmeal that's produced locally from processing waste, but the majority of it is coming from Peru, and it's a managed fishery. I think their position is that they don't feel they need to have Marine Stewardship Council approval for their fishery because they already have their own system in place.

**G. Robertson:** Is there any interest within the industry and the fish farm companies to pursue a certified sustainable fish feed?

**K. Bullough:** I think the United Nations Food and Agriculture Organization has deemed these fisheries that you're referring to as sustainable.

**R. Grierson:** That's correct.

**K. Bullough:** So I think we do that already.

**G. Robertson:** Okay. I mean, we've heard concerns about this. In light of the pressure globally on fish stocks, who's certifying what...? How do we compare sources? I guess that's where someone like the Marine Stewardship Council comes into play as a third-party certifier, at least addressing public perception and giving comfort — much as the organic certification industry has done — that things are done a certain way and to a certain standard.

I'm not clear on the FAO standards as they relate to fish stocks. Maybe you can comment more on that.

**R. Grierson:** In our presentation we gave earlier this year, there are guidelines established by that organization regarding fish size, as an example, and quotas — all the above, all the things that you would expect, to manage a fishery. We as a company — like the last speaker at the end of the table, Greg Deacon — buy from approximately the same areas, the same suppliers. We rely on that organization and the countries like Peru, specifically, to manage their fisheries. They are doing so under these United Nations guidelines, and the fishery has been stable over a 20-year period roughly.

As feed companies, we are also pursuing the avenue of reducing the amount of marine ingredients that are required in the feed, and we have been doing that for years. In my presentation I said that that is our primary focus in our research facilities in Norway. We're coming at it in a number of directions, and that's obviously sustainability-driven and economically driven, as you would expect.

**B. Hicks:** The only thing I would add is that my understanding is that on these fisheries, the Marine

Stewardship Council certifies to the FAO guidelines. That's actually what they do. The government of Peru, it's my understanding, see themselves as a sovereign nation with their own standards. They manage their fishery to the FAO standard, and they don't see the need for the Marine Stewardship Council.

I would like to reinforce that that fishery is a very old fishery, and unlike some of our fisheries, that fishery has shown itself through time to be quite sustainable. As much as we tend to criticize those fisheries, once in a while maybe we should just take a look in the mirror. We kind of think we know better. The reality is that we have not done nearly as good a job with our fisheries as they have done with theirs.

**G. Robertson:** Are those the suppliers who also supply Chile? Is that the same feedstock that basically goes to all?

**B. Hicks:** Chile has its own fishery. In fact, one of the motivations for Chile in the early days of getting going was a mechanism to value-add its fishmeal production and fish oil production and use it for salmon rather than export it to Canada or Norway or Australia or somewhere else in the world — Japan, where they turn it into tuna, for instance. It was a whole mechanism for development in Chile.

[1140]

You're very familiar with the concept here of trying to value-add wood to increase the value of the wood crop for British Columbians. Well, the Chileans did exactly the same thing with their fishmeal. Chileans use almost all of their own fishmeal locally.

**G. Robertson:** A question, I guess generally, around technology and closed containment. We've heard very interesting stories going back and looking at the history of the industry here in B.C. and the changes in the technology. Some of the photos we've seen have illustrated how dramatic the improvements have been from the '80s to today in terms of how things were put together, how pens were built and anchored, and how nets were constructed and all the rest of it.

If we look at that 25-year continuum of technological improvements.... Here we are today at a point where there continues to be many concerns, from academics in particular, around sea lice or disease transfer, effluent and problems related to open nets. If we look ahead 25 years down the line, we can assume that there will be an equivalent or even greater change in the technology in terms of containment, loosely defined.

Is the salmon farmers' position at this point that we have arrived? This is the technology, and we don't need to do an equivalent amount of progress that we have done. Or is there eagerness to look at the next innovations in containment?

**M. Walling:** Well, that's a pretty simple question to answer. I mean, the companies are continually looking at how they can invest in not just new technologies but other areas where we see opportunities for improving

environmental performance, such as vaccine development. I think that's a very good example of how you can limit wild/farm interactions — by the use of vaccines. That has been at least as amazing a transformation as the technology over the past 25 years. So when you consider that all the baby fish coming out of our hatcheries are inoculated with vaccines to protect them when they enter the marine environment.... That's another kind of barrier. It's not really a visual barrier, but it's another kind of barrier.

There's been such a buzz around closed containment as being the sort of be-all and end-all solution. We do remain concerned that by forcing adoption of this technology, we'll make the industry not viable in British Columbia. As I explained earlier, we're in an international marketplace. We want to sustain and grow the industry here in B.C.

While we remain very interested in all kinds of different opportunities around improving the industry's performance, there are questions, I think, that remain about closed containment — right down to the definition of it and what would be an acceptable definition. I think if you asked every single person in this room and some of the ENGO groups, we'd all probably come up with a different definition of what that actually means.

**D. Blackburn:** May I respond to that, as well, please? People sort of think our industry has no incentive to embrace closed containment. I'm willing to say that if every salmon farmer was absolutely truthful, probably the single biggest cost that we incur other than the actual operating — the feed, the labour and that — is brought about as a result of environmental factors.

British Columbia — and I can say this, having worked and been in all different environments where salmon farms operate — is probably the most difficult area in the world to operate salmon farms. We have some of the richest coastal waters, and with that come incredible plankton blooms.

I was recently at farms in Norway and asked them about plankton and microscopes. They don't have them on their sites. They don't have plankton nets. They don't have microscopes. They have no way whatsoever for identification of plankton. When was the last time they had a plankton bloom? They couldn't remember. One fellow thought maybe they had one four years ago, but it didn't really cause them any problems.

We offer extensive courses training our staff every year on plankton identification and techniques to mitigate the impacts of plankton.

[1145]

Having said that, if we were to have a closed containment system, I think we would build it such that we don't have to deal with harmful plankton. That would be a tremendous savings for us, and it's something that is always poking us from behind to say: "Don't forget about this technology. Look at it, because it might give you a breakthrough." I can say truthfully that it's millions of dollars a year that we lose within our company because of plankton.

That's plankton. Now let's talk about dissolved oxygen. Because of our rich oceanic waters off the west coast of Vancouver, we get a natural phenomenon called upwelling. Every year, starting in about June or July, right through to this time of year, we get massive amounts of oceanic water coming right in off the west coast that has extremely low levels of dissolved oxygen. We measure it in milligrams per litre, and it's down around four and sometimes even lower than four. We were told that it kills fish at less than four. Well, we've got news for you. Our people have learned how to keep fish alive at levels of around three.

In Norway or down in Chile, dissolved-oxygen meters.... They don't have them. They don't know what that's about. If we were to have closed containment, we would be able to regulate the amount of oxygen going to our fish — another very strong incentive because not only does it affect the growth of our fish, but it actually kills them.

We had an incident this year where we lost several thousand fish because of low dissolved oxygen in just one single incident. Those are very strong incentives when you're looking at your profit and loss statement, when you see mortalities and you see hundreds of thousands of dollars. In fact, at the end of the year you see millions of dollars in that thing. But we've been able to overcome those.

Where we as an industry get so frustrated is that these are opportunities where we could take our expertise — the people, the knowledge, the universities, all that we have — and solve these problems. We recently employed a full-time engineer to help us on plankton mitigation. It is that crucial to our business. We work with UBC and other places like that dealing with these very problems. But we're one industry, and we're one small company in a much bigger picture. We're working in a very, very difficult environment politically and environmentally.

That's just two issues. That's plankton and dissolved oxygen, and they're incredible incentives for us to look at other technology. The expression we have is that the only constant we have within our industry or within our company is change. I can guarantee you that five years or ten years from now, we're going to be totally different from what we are now. What it's going to be like, I don't know.

**G. Robertson:** Thanks for that answer. I'm reminded that in the fruit juice industry in which my business exists, we had imposed on us, essentially, almost ten years ago now the necessity of pasteurization when, for fruit juice, there'd never been a requirement around that. Due to food safety issues and to companies that got ahead of themselves and didn't maintain food safety standards to as stringent a degree as was expected, we had problems, and we had pasteurization mandated.

Actually, the sequence of it was that the marketplace demanded it. The retailers said: "We're not going to buy from anyone who's not pasteurizing." The government followed on shortly thereafter. It was a radical change in the industry, and it meant that a lot of the smaller players in the industry that couldn't afford the capital to adapt to the circumstances were gone.

It's curious to me, coming from a food and agriculture background, how open you are to dissolved oxygen and plankton, as you've just named, as two of a long list of variables that you probably contend with because of the technology that is used today and because it's a wide-open system.

[1150]

I'm curious as to why we seem to be at an impasse with pushing hard on adopting new technology and researching and proving, at scale, new technology that both addresses the issues in terms of variables and cost to business and to the bottom line, and also addresses many of the issues that opponents of the industry raise in terms of environmental impacts. I'm curious as to why we're at a point right now where there isn't huge progress being made that addresses both those sides when it looks like some degree of closed containment, whatever that definition is, would answer both of those challenges. Is there a sense for why there isn't anything at scale going on right now or why we're behind on this?

**B. Hicks:** I think there's a little bit of misunderstanding about closed containment. We have been working on closed containment. I've been in the industry since '73, and we've been working on closed containment all along. In fact, when the industry in British Columbia started, the current modern commercial industry started. It started way back in the '70s.

Fast forward to about '85-'86 when the present industry began. There was a facility in Nanaimo at Cedar, and that facility started at the same time as the industry. If you will, it was one of the technological bets that this would be successful. That's a multi-million-dollar spot on Vancouver Island currently. Tens and tens of millions of dollars have been spent there, and many, many people have tried, and it simply hasn't worked.

In addition, another local outfit called Future SEA spent millions and millions of dollars. That began in the early '90s, and through most of the '90s.... That's a closed containment system — semi-open, I call it, but that's the problem with the definition of closed containment. And it failed. It didn't fail in British Columbia only. It failed in Ontario. It failed in New Brunswick. It failed in Newfoundland. It failed in Cape Breton. It failed in Australia.

Not everybody who tried it is incapable. A lot of very capable people were associated with those trials.

I think there seems to be this concept that the industry is resistant to closed containment when the reality is that the industry is.... I refer to them as technophiles. They actually like technological change. We're trying new things all the time.

New things that work, we embrace. New things we've tried that failed, we have to abandon, because we don't have a bottomless pit of money. So we have to abandon them. Up till now the reason why closed containment isn't flourishing globally and locally is because it simply has not worked. It has not met the technological and financial challenges it brings to the system.

I think if you look at the Cedar system — lots of fail systems have been put in place, etc. — it has almost

always killed the fish there. Every single person who has tried to make that work has failed ultimately because either it was too expensive or it killed the fish. So I think the industry is not against closed containment.

You heard the arguments from Dale about the reasons for it. We know the reasons for it. We would like it to work. We would like to be able to manage low oxygen. We would like to be able to manage seals by having a wall. The simple fact is that up till now, it simply has not worked.

**K. Bullough:** To add to that, we continue to investigate other technologies that do work or do solve some of those specific problems. We don't just look at one thing. We look at many things and try to find a solution and then move on.

It's an industry that changes rapidly. I can guarantee you that the picture will not be the same 25 years from now. As Dale said, it likely won't be the same five years from now.

[1155]

**J. Henry:** Another comment, Gregor, on your point. I think we have come a long way, and the technology is increasing. There are huge strides being made. You don't see the end result yet because, as the industry has been saying all along, the end result isn't there yet.

But in terms of land-based closed containment, as some may call it, for smolt production, we can produce smolts now — compared to six years ago — that are three times as big and come out six months earlier. So the technology is there, because we can control the environment that they live in.

For our company, we've tried another species as well, which we are growing out in closed containment. The technology is developing, and the technology for that is there. We can't afford to grow salmon in it, but we can afford to grow something else in it. That technology will evolve because, as a lot of people have mentioned, there are huge benefits to having closed containment.

**D. Blackburn:** One final point. The company that I used to belong with probably has the largest closed containment farming operation in the world. It is highly successful. We in British Columbia, when we had better prices a few years ago, were always competing with our counterparts in Spain. They produce turbot. They've expanded that facility, and it is, like I say, a state-of-the-art closed containment aquaculture facility — fully land-based and everything.

I don't know the regulations they have around the discharging of effluent, but I can imagine they would be nothing like what we might face here. Having said that, I would always check the price of what they got for their product. It was at least double what we ever could hope to get for our product here, and it was on that basis that they were able to operate.

As Justin said, we actually have a closed containment land-based facility right now where we are producing salmon from here in British Columbia. It's called a broodstock site. It's up near Port McNeill. This

year we are spawning fish that we have grown through their entire life cycle on land, in fresh water — beautiful big salmon. Some of them are 20 kilos. They're incredible.

But as Justin also said, when we transfer our smolts — which are the baby salmon, the progeny, that result from this — to salt water, and we put them in, and we translate the cost of those smolts to a per-kilo basis, because that's how we measure all of our fish.... Well, I won't tell you what they are. They're astronomical, because they just can't compete. It's only after they've grown and put on some size — and we've sort of reduced the amount of inputs going into these poor little animals — that the costs actually become reasonable. That's the difference right there.

If you'd like to come see a land-based salmon farm, I'll show you one tomorrow. Off the record, I'll show you the costs that are associated with that. Then I think you'll see that from an economic perspective, it is just not viable.

**G. Robertson:** Thank you for that. I have a final question around labelling, specifically. Not going back to where we were earlier in the discussion, but we have heard concerns from wild-salmon fishers and processors around the confusion in the marketplace because there is no differentiation in terms of labelled package or requirement that way.

What does the future look like for that? Is the Salmon Farmers Association holding firm that salmon is salmon, or is there acknowledgment that farmed salmon is different from wild salmon and should be labelled accordingly?

**M. Walling:** Well, first of all, I would never say that salmon is salmon. You look at the taste of a sockeye salmon, and you compare it to Atlantic salmon. They are completely different. I like to say that it's a little bit like eating a Granny Smith apple or eating a McIntosh apple. They're both good. They both crunch. But they taste different, and so they should.

Or you can use the wine analogy if you're so inclined. Some people like Cabernet Sauvignon. Some people like Merlot. They're both red. They both come in a bottle. But for those of us who are a little more discriminating, they taste different. So I would never say that salmon is salmon. In fact, I think that one of the real benefits we have in British Columbia is that we have so many different choices of our product.

[1200]

A couple of things about labelling, for us. Our product is labelled as farmed salmon when it leaves the processing plant. We're very proud of the product that we produce. In fact, now we are also required by the United States government to have country-of-origin labelling. So not only is it labelled farm salmon, it's also labelled as coming from Canada. That's something that happens on a regular basis.

If you're talking about Styropacks of salmon — because that's how much of the product goes into the marketplace, where you have fillets or whole fish in Styropacks — once it gets to the fishmonger's case,

then it's the.... We're selling it to the retailers. So then the retailer takes the responsibility to do whatever they want with that product, whether they want to brand it, label it and so on. Our product is actually labelled, and we're very proud of our product.

I just wanted to clear up that "salmon is salmon" piece, because we think that's the advantage that we could have in establishing B.C. as sort of a centre for culinary excellence for seafood.

**J. Henry:** I'd like to comment as well, if I can. I would agree that there is some confusion in the marketplace about what people are buying when they're buying salmon. John mentioned earlier that he was looking for some farmed salmon in the restaurants and could only find wild.

A high percentage of the wild fish that you buy are farmed for a portion of their lives. You have in Alaska the production of hundreds of millions of fish where broodstock are collected, eggs are taken and incubated in the hatchery.

Smolts are produced in the hatchery with the same feeds that we're using. These fish then go out to net pens. They're fed with the same feeds that we're using, and then one day they all get dumped out to swim around and then are caught sometime later by the fishery and sold as wild fish, which is fine. They've done an excellent job in marketing those fish. But I would agree that it could add to some confusion in the marketplace, as you've said, about what's farmed and what's wild and what's in between.

**O. Grydeland:** If I can just make one quick comment too. I think the industry has certainly been making statements that salmon is salmon when it comes to the health benefits of eating salmon. I just want to point that out. I think that's certainly our position. The many health benefits that have been demonstrated through many scientific studies regarding things like Alzheimer, heart disease, and so on and so forth. Those are all well documented, and I think the benefit from eating salmon, whether it's farmed or wild, is equal in that respect.

**R. Austin (Chair):** Great. Thank you very much.

I'd like to thank you, Mary Ellen, for the presentation you made and for the members of your executive coming and answering questions. It's been very....

Sorry, I thought you were pointing over to John earlier. Al has a question.

**A. Horning:** I thought I was on the list there, but anyway.

I want to thank Mary Ellen for her presentation. As you know, I'm new on the committee, so I'm a whole year behind my colleagues here. I've got a lot of reading and listening to do.

In your presentation I was intrigued with the size of your industry. You say 4,000 people are employed in your industry. You add \$700 million annually to the economy and are Canada's largest agricultural export — this sort of thing. What's all that compared to? For

instance, the 4,000 people that are employed in your industry — how does that compare to the wild fish industry? And the largest export — how does that compare to other agricultural products? Can you enlighten me on that?

**M. Walling:** It's my understanding that the committee is undertaking an economic analysis of the industry. I think that will probably be the most useful information you will have in front of you, Al. I'm not sure what the time line is for the completion of that study. Perhaps, Robin, you could describe that.

**R. Austin (Chair):** We're still hoping to have it completed by Christmas. There's been a slight delay, because one of the principals working on that has had some family things to take care of. We're going to have a preliminary report in mid-December and a final report in January.

[1205]

**M. Walling:** Yeah. I think that report will provide the answers very specifically to some of the questions that you're asking. But I think the other thing to take into consideration is that when you look at numbers of jobs, you also need to look at where the jobs are located. For example, our processing jobs are mainly located in small coastal economies where — when you start looking at multipliers, for example, if you're in a community like Klemtu — the industry has a much greater positive impact economically than it would in a place like Nanaimo or larger centres. I think those are some of the things that I expect you'll probably be receiving in the report.

Also, it's not just the commercial fishery. While the openings have been very limited, my neighbour Terry will tell me that he's only fishing for one or two days this year and has a requirement to find other sources of income to support his family. Our jobs are, generally speaking, year-round, full-time jobs with full benefits. That also carries some implications when you're weighing different industries.

Also, the recreational fishery is very important to communities on the coast, particularly communities like mine in Campbell River and places like Tofino where we all want to go out on a boat, catch a salmon, take a picture and send it to our relatives. But that is also a very seasonal industry. There are very limited openings. Well, for those of you who were in Klemtu in November, this is not a prime tourism season, unless you like jumping up and down on the floatplane.

I think there are all those kinds of things that hopefully will be provided for you in the report that we're also looking forward to seeing.

**A. Horning:** You also talked about stability in industry and the growth potential that you need for your market. Being in business, I know that if you can't grow, eventually you're not going to succeed, because your market out there has a big demand for your product. At this point in time those markets are going

to get better, so if you can't produce enough for them, they're going to go elsewhere.

The other thing is — back to the land containment — if that ever becomes successful and you're going to grow, I would suggest you're probably going to go where your market is, and that's probably going to be in Washington or somewhere. So your industry here in British Columbia is going to be a smaller industry, or it may not even exist.

Am I right there, or am I wrong? I don't know. You people are industry people, so....

**M. Walling:** We fundamentally believe that we are growing a great product in a way that protects the marine environment with a regulatory framework, with the care and attention that we pay to raising the fish. That's a fundamental belief for our industry, for the people who work in industry who care passionately about the coast and about the wild salmon. That's kind of where we're coming from.

Will the industry not be viable? I guess I'm kind of a glass-half-full person rather than a glass-half-empty. I've been doing this job for long enough to be glad that I'm an optimistic person, because I just see that we have such a huge opportunity before us to really grow the industry in a way that is respectful of the concerns that are being raised. There's a great deal of attention being paid now to marine conservation by the American foundations. I understand the concerns that people raise, and they are important to respect and pay attention to.

We do truly have a huge opportunity for British Columbia not only for finfish aquaculture but also for shellfish aquaculture. There are more remote parts of the coast where shellfish aquaculture could be expanded in a way to really start to grow that product demand. Salmon is kind of the anchor tenant on the seafood counter shelf. Once people start eating salmon, we find that then they want to try oysters. Then they want to try clams. Then they want to try mussels. Then, my goodness, maybe they'll try geoduck, and on and on and on.

Really, by the acceptance of our product in the marketplace, we are building out the seafood industry market for the consumers. I fundamentally believe that we have a great future ahead of us in B.C.

[1210]

**A. Horning:** The last question. I know most of you went to Norway, or I believe you did. A lot of people, mayors and what have you.... I hear of everything they learned there, so my question to you is: did you pick up a lot of information in Norway, and was it beneficial? My question is: would it be beneficial if this committee went to Norway? Would they learn anything?

**M. Walling:** Well, I think it's always useful to look outside of your own narrow focus and see what other parts of the world are doing. I'm always very interested that I get asked to speak in many places, particularly right now in Newfoundland. I've been out there to

speak three times now. Areas that they're interested in are our environmental practices and how we're managing within a very complex regulatory framework. They're very interested in that, and they're also very interested in our community collaborations and how we're engaging coastal mayors and other stakeholders, especially with first nations, to move the industry forward.

It's interesting, of course, that in B.C. those two areas would not be seen as areas of success for us, but in other parts of the world they're very interested in what we're doing. I think it is always useful to travel and get information back from other places and then put it into our own context and see what makes sense for us and what doesn't, and what we are doing that's better than that part of the world. So yes, I would say it would be very useful.

**O. Grydeland:** If I could just add a quick note to that, I participated in this trip as well, and the trip that the Aboriginal Aquaculture Association organized for first nations leaders that went to Norway to study aquaculture last year at a different conference. I'm not speaking for them, but I think the main message that they came home with was the ability of the industry, the ENGO community and governments to work together to identify the real issues and work together to solve them rather than just having this polarized situation that we see here in British Columbia.

I think that was a really uplifting experience for those two delegations that went over there, and I think it was suggested there, too, that we have to find methods of moving towards that kind of approach here in British Columbia as well.

Having attended the last two days of the World Wildlife salmon aquaculture dialogue process, I think that's one of those vehicles that we perhaps can use to move in that direction.

**R. Austin (Chair):** I think Ron has a final comment.

**R. Cantelon (Deputy Chair):** I do have a final question, really. We heard yesterday at the salmon dialogue.... It was clear that the ENGOs, the environmental side, see the closed containment as a panacea to solve all the problems involved with it — whatever closed containment means, which we don't have defined. It means different things to different people, and it also raises some other concerns.

So if that's the goal that they say, what do we do with the industry in the meantime? Is the industry in such condition or state of operation that we need to perhaps stop all expansion or put a cap on it? What is the state of the industry? Can we still continue to expand and move forward while we await whatever the outcomes of these studies are? What's the industry's position on that?

**M. Walling:** I've heard in some of the presentations from some of the environmental groups that they see a transition to closed containment, whatever that defini-

tion is, as an interim step to eventually shutting the industry down. So we have some real concerns about that approach. From our perspective, we feel that we are farming responsibly. We're producing a great product, and we're making great strides in terms of not only understanding farm and wild interactions but also protecting the environment with our work around vaccines, with our containments in terms of reducing escapes, and also the work that's been done around sea lice and monitoring.

Our fish are going into the marine environment lice free, and we're treating them. I think we've got a very strong trigger level that is providing us with some real protection for the wild stocks. I would say we have applications in the system right now that we would like to see approved. We would like to see some of the partnerships that we have with first nations move forward. I think some of the first nations would like to see that as well, and we would like to grow the business in a responsible way with the kinds of regulations that have been put in place moving forward.

I don't know if my members would like to add to that, but that would certainly be our position.

[1215]

**D. Blackburn:** I think it's really important. The environmental community is the one that is espousing closed containment as the panacea for everything. I think your job, and our job as industry, is to step back, try to step out of the box and ask: "Well, why? What is the industry doing so badly now that we need to completely relocate it on land?" As Odd said, the take-away from Norway was that people were dealing with the real issues, not the perceived issues or the man-made issues.

That's why we have such an acrimonious atmosphere in this industry. We're chasing man-made issues. We need to step back and refocus on what the real issues are. Does closed containment indeed solve the real issues? Is closed containment even necessary? I think that's the fundamental question we should be asking.

**R. Cantelon (Deputy Chair):** Well, there certainly seems to be a presumption that it is, from what I've heard. That's why I'm interested that you seem to say: "Well, yes. That's where we're headed." That's kind of what I'm hearing underlying it. "We have plankton problems; we have oxygen problems. We want to study it too."

I get the drift that there's a general favourable direction toward that. Is the industry so bad that we need in the future to abandon open-net-pen, or can it be responsibly managed the way it exists now?

**D. Blackburn:** Well, we were the first country to develop what's called performance-based management systems. They came out of the salmon aquaculture review, which was invoked by the previous government in 1995, I think. Somebody had the list of their recommendations that came out. The finding of that review, which was a very intensive review, was that the industry is not that bad. It needs to work on some things, which is being done, and we can move forward.

It is not the industry saying that closed containment is the answer. I hope I didn't mislead you by saying that we would eagerly.... If it proves economically viable, yes, we would welcome it. What I was saying is that we have strong incentives to look at alternate technologies, and closed containment is only one of many.

We've also done an incredible amount of work. We have a phenomenal database of the impacts that our farms have, and we can be very proud in British Columbia of the regulations we have — where we do all the baseline surveys, we do the measurements, and then farms are not allowed to restock until the chemical remediation in the benthos around the farms is complete. Those are real positive steps that our industry has taken forward.

**O. Grydeland:** Just a quick comment, again, on what Ron was saying. I think Al also touched on it. If anybody within this salmon-farming industry in British Columbia is contemplating putting up a closed containment facility in a land-based area, I think Mr. Horning was absolutely right when he touched on the fact that we won't see those facilities in the coastal communities where the jobs are today and where they could be in an expanded industry.

I think you're right. You would have those types of facilities located near the market to reduce transportation costs. You would have to have them in places where cheap energy would be available. Along with that is the disappearance of the benefits that you see today from existing industry, not to mention the benefits we could see of an expanded industry using the appropriate technology we're using today.

**R. Austin (Chair):** Great. Thank you, again, for coming here today. We appreciate everything you've shared with us.

We'll recess for lunch.

The committee recessed from 12:19 p.m. to 1:01 p.m.

[R. Austin in the chair.]

**R. Austin (Chair):** Good afternoon. My name is Robin Austin. I'd like to bring this hearing to order.

We are going to have a briefing from the Coastal Alliance for Aquaculture Reform. There will be multiple people presenting here today. My understanding is that they are each going to take a piece of this presentation and speak to their specific little area. We will listen to the entire presentation, and then I'll open the floor for members' questions.

I would just like to state at the outset that several members here do have to leave for flights. My understanding is that the three MLAs on my right have to be out of here at four o'clock. So we have a time line, and we want to try and keep things as concise as possible. I believe Gary has to leave at three.

I'm going to quickly start by asking the MLAs on my right to introduce themselves.

**A. Horning:** I'm Al Horning, MLA for Kelowna-Lake Country.

**J. Yap:** John Yap, MLA for Richmond-Steveston.

**R. Cantelon (Deputy Chair):** Ron Cantelon, MLA for Nanaimo-Parksville.

**C. Trevena:** Claire Trevena, MLA, North Island.

**G. Robertson:** Gregor Robertson, Vancouver-Fairview.

**G. Coons:** Gary Coons, MLA, North Coast.

**S. Simpson:** Shane Simpson, Vancouver-Hastings.

**S. Fraser:** Scott Fraser, MLA on the left. That's Alberni-Qualicum.

**R. Austin (Chair):** I'm going to invite the members at the table here to introduce themselves. I would just like to mention again at the outset that when it comes to the question period later on, members will probably just ask a question, and then whoever feels best to answer it is welcome to do so. Before each person speaks at that table, please state your name so that Hansard has a record of who is actually speaking.

With that, I'm going to open the floor to Catherine and allow her to introduce herself and the others.

**C. Stewart:** My name is Catherine Stewart. I'm the campaign director with Living Oceans Society and a member of CAAR, the Coastal Alliance for Aquaculture Reform.

**C. Orr:** Good afternoon. My name is Craig Orr. I'm the executive director of the Watershed Watch Salmon Society and also a member of CAAR. I have the privilege of chairing the science team.

**R. Mountain:** I'm Robert Mountain. I'm from the Musgamagw Tribal Council that represents five tribes on the North Island in the heart of the Broughton Archipelago.

**C. Stewart:** Jay Ritchlin from the David Suzuki Foundation will be joining us momentarily.

**G. Thorne:** I'm Gerry Thorne with the Georgia Strait Alliance.

**D. Lane:** David Lane with the T. Buck Suzuki Environmental Foundation.

**C. Stewart:** In the back, I'd like to introduce Ruby Berry from the Georgia Strait Alliance, also a CAAR member group, and Stan Proboszcz, who works with the Watershed Watch Society.

Thank you very much for meeting with us today. We appreciate your attention. We know you've been hearing an awful lot on this issue, and we'll try not to be too repetitive, but we do want to sort of summarize

some of the main points from the CAAR alliance perspective.

In your hearings throughout the province, you have heard and had confirmed for you several key issues. One is obviously that the debate in British Columbia is still highly polarized and the feelings on both sides of the debate are very strong. From CAAR's perspective, we believe — and we hope you've heard repeatedly, as well, in the communities — that B.C. can have a healthy wild fishery, a healthy ocean ecosystem and a more sustainable aquaculture industry providing jobs in communities.

[1305]

We also believe that you will come to the conclusion that maintaining the status quo is not going to solve the problems, is not going to bridge the divide and is not going to move us towards a solution. Change is essential.

From our perspective, acknowledging that the problem is real is the first critical step. We simply cannot sustain denial any longer in British Columbia. We have an incredible opportunity here to become a model of sustainability. We all know that in 2010 the world is going to be arriving on our doorstep. They are going to be looking beyond just the image of Super, Natural B.C. to see what we are actually doing to earn the reputation of being a province that believes in sustainability and wants to maintain the health of our ecosystems.

We think that our natural resources in British Columbia are under threat, as they are everywhere in the world, but we are in a fortunate position that ours have not declined to the point that they have in many other areas of the world. We have an opportunity to turn the tide here and begin setting ourselves on a path towards a much brighter future, if we start taking action now.

The warnings are arriving daily. We're hearing more and more about climate change — its impact on oceans and ocean species around the world. We've just seen the recent study published that says that by 2048, all the commercial fish species will be virtually eradicated if no action is taken to reverse the trend and put our fisheries on a more sustainable path. We have more and more scientific evidence daily that points to the threats to fish species and ocean health both here and internationally.

We acknowledge that our salmon stocks are facing countless threats. In no way would Living Oceans or any of the member groups of the Alliance for Aquaculture Reform try to claim that salmon aquaculture is the sole threat to the survival of wild salmon species or to the health of clam beds.

We acknowledge that the problems that the salmon face — and their future survival — are enormous. Some of those are within our grasp to address, and some of them are only within British Columbia's grasp to address to a degree and in cooperation with numerous other jurisdictions. British Columbia can do more on climate change, but we can't reverse that trend on our own. We have to rely on the federal government and the rest of the world, quite frankly. We can do more on habitat protection, and we can do more to address land-based sources of pollution and fishing

management regimes that could help to ensure the long-term viability of wild salmon.

But there are also some elements of the threat to wild salmon that are readily within our grasp and within the jurisdiction of this province to take action on. We can take those steps to minimize the threat to our wild salmon and try to reverse the trend and ensure a healthier future for those stocks.

Aquaculture is one of those. I think it's really important to emphasize that CAAR is not opposed to aquaculture. Our name speaks for itself — the Coastal Alliance for Aquaculture Reform. We believe that the industry is here to stay. There is a future for aquaculture globally, but we want to see change. We want to see the industry on a more sustainable footing, and we hope that British Columbia can take those steps.

As I said at the beginning, the first step is to acknowledge that we have a problem. Recently the North Atlantic Salmon Conservation Organization, the International Council for the Exploration of the Sea and the Norwegian Institute for Nature Research published the convener's report on an international industry, government and science conference that was held in Norway in October of 2005. The North Atlantic Salmon Conservation Organization — for those of you who may not know — is a body of parties to the convention on North Atlantic salmon and includes the governments of Canada, Denmark, U.S., Norway, Russia, the European Union, etc. This is hardly a radical organization, nor is ICES.

In the conference report this body stated:

"Before — that is, at previous symposia — there had been a climate of blame, public accusation and counter-accusation. A major change, and a most welcome one, since the last ICES-NASCO symposium in 1997 is that the salmon farming industry now fully accept that their industry can have damaging impacts on wild stocks. We very much welcome this, because it is a prerequisite to cooperative action. We realize that this has not been easy for them to accept — that this acceptance can have major dividends for cooperation to mutual benefit in the future."

This is the place we have to reach in British Columbia. CAAR has taken steps in that direction through our dialogue with Marine Harvest, but that's only one company. We are, however, in dialogue about how to achieve solutions. Ongoing denial is not going to move us towards the solutions that are essential. It will do no more than perpetuate discord and exacerbate the damage.

[1310]

For the past three days the World Wildlife Fund has sponsored an international symposium, the salmon aquaculture dialogue, and it's been meeting in Vancouver. It brings together senior representatives from the industry in Norway, Chile, Scotland, U.S., Canada and also ENGOs from around the world — World Wildlife Fund being among them of course, and CAAR and other groups.

This dialogue is attempting to find its way through the problems and start identifying solutions and mechanisms for change, to put the industry on a more sustainable footing. I think it was very telling that

representatives of the Ministry of Agriculture of British Columbia, the Department of Fisheries and Oceans, the Salmon Farmers Association, Greenspirit — the consulting firm — and others who you have heard from on this issue were in the room and had the opportunity to raise questions of these major industry representatives and scientists and feed companies and others who were there, and failed to do so. They were silent. They had no questions to ask.

I have to ask myself why. The industry globally is acknowledging that problems exist, as that ICES-NASCO report reflects. The industry globally is acknowledging that it has to undertake change. It was very disconcerting and, I think, rather telling that the silence from our government representatives was so comprehensive.

We hope that the committee will move us from denial to solutions and that actions will be recommended to sustain the wild stocks in British Columbia. You heard from a witness not too long ago who dismissed pinks, saying they were only worth five cents a pound and had no value at all. As an environmentalist and someone who is committed to ecology, I was shocked by that statement. I think it so underestimates the value of wild salmon to the entire ecosystem of coastal British Columbia and its role in the health not only of all the species that attract tourists here from around the world but also in even feeding our coastal forests.

The University of Victoria study has indicated that 70 percent of the nitrogen in riparian forests on the coast originates from salmon that are brought into the forest by predators. So we can't in any way dismiss the value of the pink salmon or the value of the wild salmon. We hope that some of the testimony you'll hear from our members here today will help set us on the path towards a much more sustainable industry.

With that, I want to turn it over to Craig.

**C. Orr:** Thanks to the committee for listening to this once again. It doesn't seem that long ago that I was speaking to the committee. Hopefully, I won't go over too many of the same topics.

I also wanted to say that Alex Morton was supposed to be here today. She lives in Echo Bay, and it's a long way for her to get out with bad weather conditions. We talked a little bit about the presentation, and I'm doing this with her, although the errors that may be in it are mine alone at this point.

On behalf of the science team of CAAR, I want to go over some critical lessons in aquaculture science. I apologize up front because I'm so sea lice-centric. There are many issues that we just don't have time to deal with. We have other concerns about salmon farming, including escapes. As Catherine was telling you, the Europeans have far greater concerns about escapes, because when Atlantic salmon escape in Europe, they compete with wild Atlantic salmon. That's one of their huge concerns.

We have concerns over waste. There was a recent publication just released last week about pollution under European salmon farms, which documented de-

clines in biodiversity because of the smothering of the benthos, or the bottom-dwelling creatures.

[1315]

I have had the honour to work with my friend sitting to the right, Robert Mountain of the Musgamagw Tsawataineuk Tribal Council, on some contamination studies in the Broughton. Robert and I, along with some others, co-authored a paper recently on mercury transport from the forage fish to the feed and under the cages in the Broughton Archipelago. We've documented that the rockfish in particular concentrate that mercury in their flesh and elevate the levels because of bioaccumulation. So there are many, many other issues, but sea lice is the one that I will focus on today.

Just in a very brief summary. Alex has spoken before about the overwhelming evidence that lice from farms not only transfer from the farms to wild fish but cause population declines in wild fish. She spoke to the salmon aquaculture dialogue the other day and indicated that she's published five papers and has several others in press on this subject. She is, as I said at the last meeting, the most prolific expert in terms of publication on this coast.

At the last meeting I spoke in general about uncertainty — how the burden of proof to prove that actions harm wild fish has been shifted onto the public, on the ENGOs, on the academic scientists, and away from the agency's scientists. We talked about the pathology of resource management — in particular, the culture of denial and obfuscation and the use of uncertainty as a tool to maintain status quo. I even threw in a little bit of farm data just to show some of those issues.

How can we do something different today that will highlight some of these issues that we have and point out some of the silliness that's been pervading the argument so far, if I can use that term? I thought back to one of the great Canadians that we have — a comedian from Newfoundland, Rick Mercer. Hopefully, everybody has seen his very hilarious *Talking to Americans* show, where he goes down and talks to a variety of Americans about seniors being put on ice floes in Canada and things like that.

Of course, what he's trying to portray is Americans as insular, ignorant and indifferent — maybe some other things too. He does it with a good dose of humour. In contrast, Canadians are supposed to be viewed as worldly, educated and caring. That's not always the case in terms of some of these resource issues, unfortunately.

I thought I'd do a brief talk today on Europeans talking to Canadians. We've had several workshops on sea lice in British Columbia. I've helped organize four. We have another one next month, and we're bringing in European experts to all of these workshops. We read their publications. We listen to what they say. They have recently produced, as Catherine told you, a convener's report on what the status of acceptance of knowledge is in Europe. I have e-mailed this to your Clerk as well.

It's a very interesting report. I actually got a copy of it from Malcolm Windsor last week, who was just in

British Columbia as well, and he'll be back. I want to just impart a few lessons from the Europeans. I think it's very valuable to take that broader perspective. So that's the nature of the talk today.

I think the first lesson that we hear — in their publications, when they come here and talk to us, the e-mails that we get back and forth from them, and when they talk to our scientists here, our academic scientists in particular — is that they keep pointing out that science is advanced through the sharing of information. That's how science is advanced. It's not advanced by putting up firewalls, which we seem to have done in this argument. It's advanced through the peer-review process, not through grey literature that communications branches of agencies take and spin.

You've probably seen the sea lice communications plan of Fisheries and Oceans that was obtained through access-to-information efforts. We see a little too much of that.

It's also advanced through the weight of evidence — right? We don't necessarily have cause-and-effect links in science in terms of how we advance science. In general, it's advanced through the weight of evidence. So there are a hundred studies done, and 99 of them show a certain thing. That's how science is advanced.

We seem to be hung up in many cases on the fact that there's no definitive link between the sea lice that come from salmon farms and the sea lice that appear on wild fish, because we haven't found the tracers or the markers to show that those are the exact same lice.

[1320]

The weigh-of-evidence, as discussed in Europe and at workshops in British Columbia, has suggested that the weigh-of-evidence approach is very clear on this whole subject — that sea lice come from salmon farms. I will show you a little bit later that there's evidence, too, that they do impact wild stocks of fish.

I'm going to suggest that you can summarize everything you've heard about sea lice so far in four different categories on the weigh-of-evidence that suggests that lice come from farms. I've looked at this weigh-of-evidence for quite awhile, and I've tried to boil this down into as simple a way of portraying it as I can. This is as simple as I can get it so far. These are the four sources of evidence that suggest that lice come from farms.

First off, lice are most common on juvenile salmonids in areas with salmon farms. We've done an analysis for British Columbia areas. Where there are no salmon farms, there's very low prevalence of lice on wild fish; with salmon farms, fairly high prevalence. This has been borne out through study after study around the world. The evidence is very comprehensive.

The second bit of evidence shows that louse abundance and prevalence next to farms tracks louse production on farms. That is, in first-year farmed fish where you don't have many lice because they've just been put into the salt water, you don't see lice larvae around these farms.

Maggie McKibbin, a Scottish scientist, has come over here and given a couple of talks on this. But when fish are in the second year of their production on farms,

she was able to find, in Scotland, large numbers of larvae in the water around those farms. There have been other studies showing the same thing.

The third source of evidence suggesting that lice come from farms is that farmed salmon are by far the most abundant hosts of lice in the springtime. We have millions of farmed salmon being raised in the Broughton Archipelago alone, and studies that have tried to show that lice may be coming from wild salmon have only found a few hundred wild salmon, in the springtime in particular. That's a time of concern for the infestations on the juvenile fish.

We can actually give you the numbers of farmed fish, at least for Marine Harvest farms in the north. We don't know for some of the other farms because they don't share that information. By far, farmed salmon outnumber all wild salmon hosts in the springtime.

The fourth bit of evidence suggesting that lice come from farms is that when you actually follow these farms — that is, you either use chemical treatments to reduce numbers of lice or you harvest fish — you reduce the numbers of lice on wild fish around farms.

Marty Krkošek and CAAR have collaborated on a study this year, funded by the Pacific Salmon Forum, where we looked at the reduction of lice on the farms through SLICE treatments. Marty Krkošek looked at the numbers of lice on juvenile fish around those farms and found that they were reduced through these treatments. There is all kinds of evidence from around the world that this does happen.

I suggest that all the evidence you've heard so far on this subject would fit into those four categories.

Another lesson that the Europeans tell us and that Catherine alluded to.... No, sorry, she didn't. That was another point. This is another one. Lice harm the industry too. In fact, a recent estimate suggests that the cost to the salmon farmers in the world is something like \$100 million U.S. per year to deal with the lice situation. That's just on their farmed fish.

Lice affect fish health on adult fish too. They reduce the growth. They reduce the survival. They cause secondary infections on these fish which are costly to treat through chemicals and antibiotics. They cause ulcerations and scarring on fish, and that reduces the market value of these fish. It affects the operating costs, and it affects the bottom line to the tune of \$100 million a year. So the farmers don't like the lice either, and I think that's something that should be pointed out to this committee.

Two points that concern the salmon conservationists in this room.... Lice harm wild fish too. The evidence is really incontrovertible on this as well.

I wanted to tell you some of the lessons of some of the people that have come here. That photo that's hard to make out is Bengt Finstad, who's a Norwegian louse researcher. When he was over for a workshop in 2002, I took him out to Port Alberni.

That's a Port Alberni sockeye that he has. It's the first wild salmon he's ever caught. This guy has studied wild salmon all his life. It's the first one he's ever caught and kept — not just kept but caught. He identified the

lice for us, and it was kind of fun and everything. He was a big hit when he took that back to Norway with him. He just doesn't have that opportunity because there are no numbers of wild Atlantic salmon that you can harvest anymore in Europe.

[1325]

What Bengt told the workshop at SFU in 2002 is that in several experiments that he's done, it takes between 0.75 and 1.6 lice per gram of juvenile fish to kill that fish. There's a lower and an upper end, so sometimes as few as 0.75 lice per gram of fish are fatal, and sometimes it takes up to 1.6. On average it's about one louse per gram of fish, confirmed by recent experiments and published in several journals by Alex Morton, Rick Routledge and others.

Next slide, please. This is what Catherine alluded to. There's a photograph of the cover of the recent convener's report. We also know, from the European evidence in particular, that lice affect wild salmon at the level of the population. Industry does now acknowledge that its activities can have damaging impacts on the wild stocks.

The last time I spoke in front of this committee, one of the questions I was asked was: can you give some evidence of scientific misdirection or...? I'm not even sure what the words are. I didn't really have too much time, and I didn't go into too many examples. But if I had a little more time, I would have gone over, in more detail, the escapement graphs for pink salmon in the Broughton Archipelago that had been compiled by the Coastal Alliance for Aquaculture Reform.

These are odd-year returns of pink salmon. Of course, people probably understand that they have even- and odd-year returns. The even-year returns are stronger in the north, and the odd-year returns are the weak returns. What we did was analyze DFO's escapement data. You can see the vertical line in the graph. It's a little hard to see, but it's in your handouts. That's when salmon farming began in earnest in the Broughton Archipelago.

You can see the escapement trends from the various rivers. You can look at these escapement trends, and they look remarkably the same in terms of what has happened since the advent of salmon farming. We had somewhat lower populations at the beginning of that graph. That was because at one time there were healthy commercial fisheries that were catching fish, so the escapements were kept down to an average of 52,000, for instance, on the Wakeman River. But you can see that after salmon farming, those escapements have crashed precipitously in this river.

The same thing can be shown for the Kakweiken River, down to 56,000 fish. The same thing can be shown for the Kingcome River.

You have to compare these with something in order to really understand and appreciate the magnitude of the decline. What we did was graph out the escapement trends to the Nass River system, an area where there is no salmon farming. The trends are increasing for the numbers of pinks. Pinks are quite healthy, in general, in the Pacific, but there is a local anomaly in the Broughton Archipelago in terms of declines in

numbers of pink salmon in these rivers, with the exception of this one system — the Glendale.

There is an artificial spawning channel on this system, and it's the only one there. We don't know why there is a spike here, but in terms of what I said earlier — scientific misdirection — if you combine all these slides, you will see what I'm talking about in terms of potential obfuscation on the results. Eighty-five percent of the pink salmon on the odd-year return now come back to one river system in the Broughton Archipelago.

These are DFO data. We didn't make up these data. These are escapement data, and I'd be happy to give you the Excel charts for all of these if you want to do it yourself. If you just look at them all combined, you get a completely different picture about what's actually happening in the Broughton Archipelago.

I think what is needed — I have asked this of various government agencies, and CAAR has as well — is an independent review of escapement trends in the Broughton Archipelago. We do not have that at this point. It's our data, your data, DFO's data. Nobody really knows whose data they are at this point. But that would be something that would be extremely helpful for informing the situation.

It's a complex situation because you have so many river systems, but what we've seen so far in mapping out these data... Maybe we're not independent, so that's what we need. We need to have somebody look at those escapement trends, whether it's a conservation council or the PSF or someone else.

[1330]

Lesson 4 is that consistent action is required to minimize the harm. A lesson from Karin Boxaspen — another Norwegian louse researcher, who will be in British Columbia this coming month — says that monitoring the level and development of lice is an important factor in managing the sea louse problem.

We do not consistently do that in British Columbia. In fact, we don't know what's happening on most of the farms. We know what's happening on two of the farms because those are the farms that the Coast Alliance for Aquaculture Reform and Marine Harvest monitored in this last year — two of the farms out of about 85 that are active on this coast.

The case is very different in Europe where reporting lice is mandatory under the Norwegian action plan against salmon lice, which was put into force in 1997. There's a graph from Bengt Finstad. Those are the farms that must report to the public on what's happening.

What the Europeans have also told us, though, is that consistent action may not be enough. Peter Heuch, who is a doctor of veterinary medicine and another Norwegian louse researcher that we're in touch with frequently, has just written a review of the Norwegian action plan against salmon lice. It's a 2005 paper. I can share that with you if you'd like, but I'm just summarizing here.

What Dr. Heuch found was that attempts to minimize lice outbreaks during the critical two-month spring migration period, when you must have no more than two mobile lice per salmon on the farm, are offset

by increased production in farms. So that is a consideration.

When you set limits on numbers of lice that must be on farmed fish, whether they're realistic or not.... And we really don't know. No one has done any studies on the relevance of these lice triggers for treatment or whatever. But when you set these triggers — whether it's three motile lice per farm fish, which is a trigger for action in British Columbia, or two in Europe — we have this question: what is a minimum? This is coming from the Europeans: what is a minimum? How far do you have to reduce these lice levels before you do not cause harm or before you recover wild populations of fish?

What Dr. Heuch has found is that with Norway's limit, they have not been able to recover the wild stocks in Norway. They have not yet been able to recover, even though they've gone far beyond what we've done for louse control. We have had a one-time action plan so far in British Columbia, and we're not consistent by any means.

In B.C. we also have the challenge of establishing size-sensitive, effective lice thresholds, as I've just alluded to. This diagram shows you the relative sizes of two Atlantic salmon species of smolts and two Pacific species of smolts. The one at the top is a pink salmon. The one right below that is a chum salmon. They emerge from the gravel and head right to sea. They're very tiny. They weigh less than half a gram each when they head to sea. The Atlantic salmon smolts and the sea trout smolts are almost an order of magnitude larger.

Keep in mind that it takes one louse per gram of fish to cause mortality. So you can tell just by doing the simple math that one louse may be fatal on these smaller Pacific species, but these larger Atlantic species can take a much higher load.

Some researchers in Norway, Jens Christian Holst in particular, have found that you cannot find an infested Atlantic salmon smolt around Norway with more than 15 lice. More than 15 kill it. So somewhere between ten and 15 is fatal on these larger fish, and about one for these smaller fish. This is a real challenge for British Columbia — managing lice predation on these very, very tiny fish.

Another B.C. challenge is treating farm fish in a timely manner. I did show one of these graphs at the last meeting. This graph is a little hard to see, but the solid lines that you see are the numbers of lice per farm fish on Marine Harvest farm fish for 2003 and 2004. The peaks of lice occurred around January, February and March in both years, and the arrows at the top show when the farms used SLICE to reduce these numbers of lice on these fish.

[1335]

What this graph shows is the numbers of lice that we counted on those two farms in the Broughton Archipelago this year, which I've discussed before. There is a larger version of this graph on the back of your handout so that you can see it a little bit easier.

What these graphs show collectively is that we treated too late. In the only three years that we have

data, we did not start treating for sea lice until we saw the peaks. So we could do a much better job if SLICE was the answer — a sustainable answer — in treating these farms.

We must start treating earlier. We have full-blown louse production happening. I have estimated in a paper that's in press that in two weeks during the winter of 2004, on all the Broughton farms operated by Marine Harvest, the lice from those farm fish producing 1.6 billion eggs over a two-week period.... Just before the juvenile salmon from the rivers went by those farms. That is not a risk-averse strategy for managing sea lice, and we must get better.

I'm just about done, so I'll finish off. One of the other B.C. challenges, of course — and challenges around the world — is the fact that chemical therapeutants are not a sustainable answer. Karin Boxaspen and other researchers have shown that all pest species eventually develop a resistance to these chemical therapeutants. It's a given. SLICE — they haven't, at this point, but it's just a matter of time. We've been told that by pest management specialists that we've consulted as well.

My final lesson is that Canadians are not ignorant. I don't think we are ignorant. I think we're just a bit behind the world due to our learning lags that we've all discussed and the fact that we can't seem to transfer knowledge effectively. We can't seem to give credence to what the Europeans have found. At least the agency scientists don't seem to be able to do that.

I think the final lesson that we may get out of this whole lesson is that saving wild fish may require separating them from their farm brethren, because it's going to be very difficult to find sustainable solutions in open-net-cage aquaculture to controlling the sea louse problem.

**C. Stewart:** Gerry is going to briefly speak to us next about a paper.

**G. Thorne:** You have in front of you a paper we've submitted for your consideration by Prof. Bill Rees at the University of British Columbia, regarding the eco-footprint of net-cage salmon farming. Professor Rees, as some of you may know, is one of the originators of the ecological footprint theory. An ecological footprint is a measure of the load imposed by a given population on nature.

I'm just going to summarize this paper for you, because it's quite technical in nature in some places. To summarize, it represents the land and marine area necessary to sustain current levels of resource consumption and waste discharge by that population. It's a calculation that estimates the area of Earth's productive land and water required to supply the resources that an individual or a group demands, as well as to absorb the wastes that the individual or group produces.

Professor Rees's paper looks at issues related to the collapse of global fish stocks, the nature of the ecosphere and the human impact on it and the footprint of the net-pen salmon-farming industry. His view is that the human enterprise is thermodynamically positioned to consume the ecosphere from the inside out — if you

can get your head around that — and that fish stocks are just the most recent casualties of this inevitable process and that *Homo sapiens* are inherently unsustainable. I confess I had to turn to *Google* to remind myself about the meaning of the second law of thermodynamics and entropy, but once I got a grasp on it, it made a lot of sense. I was going to urge this paper on you as bedtime reading, but I decided that I would reconsider as it might give you nightmares, in fact, instead of dreams.

What has this got to do with net-pen fish farming, you might ask? Well, after his rather apocalyptic assessment of the future of the world, Professor Rees talks about myth-making, the human capacity for self-delusion and the fact that humans generally prefer illusion to reality, if the latter is going to inconvenience them.

He says that recognizing that some resources will become depleted, economists have developed a mythic construct known as the principle of near-perfect substitution. Rees refers to an article in a business newspaper here in British Columbia that suggested that as wild fish stocks diminish, farmed fish can replace them — that through technology, humans can substitute for nature.

[1340]

He then sets out to disprove this idea. To do so, he assesses the ecological footprint of the net-pen salmon-farming industry. First he looks at feed ratios. I know you've heard quite a bit about feed issues in your travels here. He states that the feed industry represents a significant version of high-quality animal protein, which might otherwise be available for human consumption, and that the 20-percent trophic level transfer efficiency associated with the conversion of feedstock fish to salmon shows that salmon farming actually reduces the total amount of food available to humans — food that could be consumed by the poor and feed-exporting countries.

In fact, one study shows that in the 1990s, as more food fish were diverted to the feed industry, the quantity of fish in the diets of the average Peruvian declined by 50 percent. Rees would argue that the farmed salmon is not going to feed the world, as some have suggested recently. I know some of the mayors that came back from Norway.... I spoke personally to one of them, who suggested that increasing farmed salmon production in British Columbia would help feed the world. I think Professor Rees's thesis disproves that.

Second, Rees looks at energy dissipation. He provides data that shows it requires the equivalent of 1,300 litres of diesel fuel and 3.3 tonnes of carbon dioxide emissions to produce a tonne of salmon feed. A single kilogram of farmed chinook salmon fillet, ready for the plate, has an embodied industrial energy content equivalent to five litres of diesel fuel. Regarding the industrial-ecological footprint of salmon farming, Rees showed that it takes between 12 and 16 hectares of land and aquatic ecosystems in photosynthetic production and assimilative capacity to produce a tonne of farmed salmon per year.

Thus, he argues that the fleet fishery for wild salmon is generally more efficient by a factor of 2 to 3. The global ecological impact of fish-farming technology

is threefold greater in the case of farmed chinook compared to captured pink salmon.

Professor Rees concludes by stating that data shows that in the year 2000, net-pen salmon farming was failing on both biophysical and social grounds. The industry expends large quantities of costly and increasingly scarce fossil fuel to do several jobs that wild salmon do for free. We are taking food off the plates of poor people in developing countries to satisfy developed countries' appetites.

I suggest to you that nothing has changed in the last six years since that data was analyzed. This report, as it indicates on the cover of the paper I've given you, was submitted to a salmon conference at Simon Fraser University in 2003. We all recognize that there are serious problems with declining wild fish stock, as both Catherine and Craig have alluded to. But should we give up on protecting wild stocks? Well, we think not.

We need to resolve the feed and energy consumption issues if salmon farming is going to be sustainable. Moving to alternative feeds and closed containment systems would be one step towards that. The closed containment pilot project will, hopefully, move the industry in that direction. So the question is really: can't we find a way to protect wild fish while producing farm fish? That's the challenge.

Have a look at that paper. As I say, it's not easy reading. Professor Rees is an internationally renowned scientist. He travels the world, talking about the ecological footprint theory and analysis. It's pretty apocalyptic when you look at his conclusions about the future of the human race, but it's certainly worth a read — maybe not at bedtime.

**C. Stewart:** Robert Mountain from the Musgamagw Tsawataineuk Tribal Council is going to speak to us next.

**R. Mountain:** Hello. I spoke before you in Alert Bay, but I was unprepared. Now I have a PowerPoint to show you. Well, I have to show you, because some of you guys didn't come to the beach when we wanted you to. Gregor was the only one that got off the boat.

Interjections.

**R. Mountain:** I'd just like to show you this contrast. There's a picture of our traditional canoes and our youngsters and that, who are wholly embracing our culture again and dancing and singing. This is one of the protests that we held in our territory for the fish farms.

[1345]

We are five tribes in the heart of the Broughton Archipelago. The two bands, Kwicksutaineuk–Ah-kwa-mish.... It's an amalgam of bands, so there are five of us. It says that we are all working towards removal or transition to closed containment fish farms in there.

Just to let you know, our member bands once wanted the removal of the fish farms, completely, from our territory — no questions. But we have come to a great compromise, with years of meetings with our community, to get them to compromise on closed

containment. That was the hardest fight we ever had. Now we're trying to convince industry and government to do that. We've already compromised, and we hope the government and industry can do the same.

Next slide. This is our territory. You guys were up there, and you could see the farms are all in the traditional territories for our five tribes.

Next slide. Of course, you know we're a member of CAAR.

Next slide. I wanted to show you this one because all the fish farms there.... You'll notice the green area is where all the clam beds are. The fish farms are all in relation, close to it, and everybody knows where the tides run in and out. So where the fish farms' waste or anything.... They're going to our clam beds. That's how close they are to all the clam beds in the Broughton.

Next slide. This is what we were dealt with. We have never been consulted with these fish farms in our territory. All of a sudden in the '80s they just popped up, and we were never consulted when they were brought into our territory. They did come to speak to one elder in the Gilford village there. Basically, he told them not to put them here, here and here. But the farms were put where he told them not to put them.

All these sites that are in our territory have never gone under a CEAA process, the Canadian Environmental Assessment Act. Just the new ones there — Humphrey Rock, Doctor and Bennett Point — were the only three, because they're recent sites.

Next slide. I wanted to show you this map. It was a study done by John Harper about clam terraces in our area. These are all documented. There are over 365 clam terraces in our area, and this shows the existence of first nations doing farming almost 8,000 to 9,000 years ago. They went in where these clam terraces are and identified a site where the firepit was for the home. They dated the shell middens back 8,000 to 9,000 years. So they were in this area around the clam terraces for that long. These are all our clam terraces. We were farming for thousands of years.

Next slide. This is basically what a clam terrace is. It's a modified beach with a rock face in front of it. It's easier for harvesting because you harvest at a higher tide than normal.

Next slide. Here's a picture of the clam terrace at one of the beaches close to the Gilford village. This was one of their social and ceremonial beaches, but since there are three farms around that beach now, they don't get clams from that beach anymore because they're afraid to eat them.

Next slide. The same with this one. This one is just around the corner from that one. They won't go to these beaches because of the fish farms around there.

Next slide. This slide shows how close the fish farms are to our clam beds. We all believe that the siting criteria are sorely inadequate because they're so close to the beaches, in shallow areas and in bays with no flushing at all.

Next slide. Here are the pictures that I was hoping everybody would get off the boat and see where the clamshells are on top of the soil and all dead. Even if you dig under it, you cannot find live ones.

Next slide. Here's another problem with the sea lice, which we are seeing more evident in the last couple of years. There was a study done in the Bay of Fundy on the sea lettuce on these beaches. We're finding this on most of our beaches closer to the fish farms. The farther you get away from fish farms, you don't see this lettuce on the beaches.

[1350]

A big problem with this is that they identified that our clams would have a spawning problem because they can't spawn with this lettuce on top of them. If they do spawn, the spat has no place to land on substrate. They need some substrate to land on. This lettuce smothers the whole beach. This is all around the fish farms and nowhere else.

Next slide. Just to let you know, when I step off the beach, I sink six to eight inches on this beach every time I get off in the....

Next slide. Here are more dead clams. The sulphuric smell and the muck are very evident on these beaches, and they're not evident farther away. Like, 15 to 20 kilometres away, you don't see this on other beaches.

Next slide. Hmm.

**C. Stewart:** A photo there we'll try and recover.

**R. Mountain:** That picture that just popped up — those were bad clams. You can see the darker colour on it, the darker meat. It's pretty awful to see. When we get the slide going, you'll see the contrast of a healthy clam compared to this clam. It's quite shocking to see because these clams were taken close to the fish farms. We have to go 15 to 20 kilometres away from fish farms to get healthy clams now. It's a big problem with the village there — Gilford village, then Kingcome village, New Vancouver and Echo Bay. The people have to go farther and farther out of the Broughton now to get their clams, so it's pretty bad.

The one thing I'd like to say about the contamination on our clam beach and everything else is that we see it every day, and our clam diggers are out there all the time because we live out there. Everywhere I went, every meeting I went to, I never heard industry, government or anybody deny that this is a problem. I've never heard anybody deny that there's contamination on our beach, and I'd like to know why.

Okay, here's the picture of the clam close to the fish farm. Nobody in our territory would eat it, but I could bring samples to you if you want.

Next slide. Here's more contaminate.

Next slide. Here's what a healthy clam looks like. It's greyer in colour, not dark and black. It's pink.

And here's the contrast. You can see the total mushiness and dark colour. It's not the same. It's quite striking, and people in our territory are just getting fed up with it because it's getting harder and harder to find clams now. We haven't even had an opening in our territory because of the beaches that are close to the fish farms. Now they can't find any littlenecks around the fish farms anymore. There is no market for butter clams right now, so they're not out there commercially

digging, and there are no littlenecks closer to that. There's no commercial digging, so a lot of the commercial people are not working right now.

Next slide. I have no idea what this is. It was found on a beach, and it's been found all over the area. It's a mat of algae or something, and it just smothers the beach. When we were out there with Dr. Marty Weinstein, he said he was going to get it examined somewhere. I haven't followed up on that. It just covers the whole beach. We don't know what it is, and I'd like to know if anybody else knows what it is.

Next slide. We're having more and more problems up there with a lot of the commercial prawn fishermen and stuff, noting that there's less abundance of prawns and shrimp in our territory because of all the fish farms in the area. The home clans have to go up Knight Inlet and Kingcome Inlet, far away from the fish farms, just to get feed now.

Next slide. These are all the problems that we've come up with. People are even catching halibut and ling cod with stuff like this on it and loaded with sea lice. That's only close to fish farms. Farther away they have to go for halibut and cod too. The people that live out there need more money for gas in their boats and just to travel farther and farther.

[1355]

The social problem is really bad because there are no jobs or anything out there for them, and they're living day by day. They live off the ocean. It doesn't cost them money, but the gas to get out there is a big problem for them.

Next slide. Here's another result of parasites closer to the fish farms. This is only found where there's sewage. Next slide. Same thing.

Next slide. I wanted to show this to you, because this is a DFO map, and you see they have 82 streams named in our territory. This is what was traditionally checked for how much fish was in our territory. But in all our local knowledge and TUS stuff that we've done, we have identified over 120 streams that we traditionally used, and DFO only identifies 82 of them.

I personally have walked 47 of those streams to identify how much fish were in them. We used to check these smaller streams. They had 10,000, 20,000, 30,000 or 40,000 fish in them — Lull Creek, Protection creek, Hoya east and west, Bond Sound and all those other creeks. DFO doesn't acknowledge those creeks anymore, but I'd like to check them now to see if they're still at 10,000, 20,000, 30,000 or 40,000 fish in these streams that are never identified.

Of course, the sea lice problem is really bad up there, and I'm grateful that we have so many people working on it, because the Musgamagw Tsawataineuk Tribal Council has no capacity, or doesn't have their own biologist or anything. I'm so thankful for Alexandra Morton and Marty Krkošek, for all of them doing their work — and DFO. They're doing their work up there too.

I wanted to show this picture of everything else, just visual, to let you all know that people who have never come to our area don't know what's going on.

They need to see these pictures, because everybody who speaks for the fish farms — who says there's no contamination or damage — has never come to our territory to see what we see every day. We want everybody to come up to our area before they speak. You cannot say there's no problem if you don't come up and see it.

We know the government, the federal and provincial, industry.... Everything is out of sight, out of mind. If they don't see it, they don't acknowledge it. We want everybody to come up there and look to see what the problem is. I want somebody to speak on what we see. Nobody has denied there's contamination on our beaches. Nobody has denied there's any problem with our clams.

We were part of a clam contamination study with Health Canada, Assembly of First Nations and B.C. Ag and Fish. We tested for metals, PCBs and pesticides, and they did find contaminants in there. Canadian Food Inspection says the levels were below acceptable limits, but the professors at UVic and SFU who were there could not find the causal link because there were no markers or tracers to identify our fish farms.

We couldn't get feed samples, fish samples or anything from the fish farms. They denied that for two years. We were trying to get it so we could get a marker out of the feed and feces and fish so we could identify what came from a farm and landed on the beach, and we couldn't get access to that. They denied us for two years when we were doing this study.

Just to let you know that I'm not here for myself. I'm not a fish farm basher or anything else. We here are not anti-fish farms. It's only that we want employment for whoever, as long as it's not damaging our resources and stuff like that. I'm here speaking for my community and everybody who lives out in the territories, who are being affected socially and emotionally. It is killing our people.

**C. Stewart:** David Lane from T. Buck Suzuki Foundation is going to speak next.

[1400]

**D. Lane:** I'm going to speak on the B.C. regulatory regime for salmon farming. I was seated on the Salmon Aquaculture Implementation Advisory Committee set up by the provincial government back in the year 2000. Its purpose was to bring together stakeholders — including conservation groups, first nations, the B.C. Salmon Farmers Association and some of the major industry players — to a forum to look at what kinds of regulations were needed, given the recommendations coming out of the salmon aquaculture review, which was an extensive examination of the salmon-farming industry and its impacts back in 1997. It gave me a good view of what the regulations were as they came in and some changes that were made to them.

My theme is simply that, though I've heard from many quarters that B.C. has the toughest regulations in the world as far as salmon farming, when you actually look at them and how they're implemented, when you look at how they're enforced and you compare them to

other jurisdictions around the world, in fact they're not the strongest. There are many aspects that are just weak, lacking in clout and predominantly ineffective at preventing the harm that we're trying to prevent.

Most of the regulations were put together with quite extensive consultation with the salmon-farming industry and accommodation with their interests, but there was no consultation or accommodation with conservation groups or first nations as they were put together. I think that has skewed how the regulations have manifested themselves. The result is that most regulations have quite minimal standards, and many regulations are quite unenforceable in any practical sense.

Many regulations are based on self-reporting by industry, with few or no independent checks and balances and often no audit mechanism to determine if numbers are real or accurate. Information that should be public and transparent has not been written into the regulations to require that to be made public or even made available for government, resulting in a black hole of secrecy, a lack of public accountability and a lack of information needed to formulate environmentally meaningful public policy.

The proof of any effective regulatory regime is not in the words on the paper but in how it's implemented in the real world and ultimately: what is the effect on the environment, what is it trying to achieve, and does it achieve it?

I'm going to go through the main areas of regulation — siting of farms, escapes, waste management, marine mammals and other species, global fish stocks and, lastly, disease and sea lice. There is a set of siting criteria that was established. They are not identical to what was recommended with the salmon aquaculture review. They are close, but on many key items they are lacking.

The most important, given the whole debate on sea lice and disease transfer, is that the siting includes that farms should not be sited on sensitive habitats. That was done in consultation with the Department of Fisheries and Oceans, who determined that sensitive habitats include salmon migration routes.

Those migration routes have not been mapped. They haven't been identified. They haven't been taken into account in the siting decisions that have followed, and there has been no attempt at relocating farms from migration routes, as would be the intent of the salmon aquaculture review.

We were given assurances from DFO during the salmon aquaculture implementation meetings that DFO would take the issue of salmon migration routes seriously, but in fact it has not. Farms are still being sited on migratory routes, even one in the Broughton Archipelago where we have the most evidence of harm on one of the most important salmon migration routes. Humphrey Rock was established as a new farm in 2003, despite its being right at the juncture of Knight Inlet and Tribune Channel.

There has been no first nations or local community participation in siting decisions, as was recommended by the salmon aquaculture review. If that had hap-

pened, there would have been a very distinctively different result, particularly in the Broughton Archipelago.

[1405]

The second area of regulation is escapes. An escape regulation was brought in that would establish, mostly, the structural issues of making sure that cables and net pens and the framing and the net structures would be adequate — testing nets for strength. These are measures that are good and that are useful to at least know what the standard is for the structure of a pen. But the ultimate result is: is it preventing escapes?

What we do know is very little, in that the escape numbers are self-reported. It's just what farmers are saying are escapes. There is no audit, no independent analysis, no observer program to actually see if those are the real numbers.

In a compliance report put together by the Ministry of Agriculture and Lands, we see that there has been an average of about 32,000 escapes per year. That's not "no escapes." There have been a couple of years that were very good. There are a lot of people who are skeptical about those numbers, and many people are thinking that small escapes are just not being reported properly. But in any event, over seven years, 72,000 escapes per year. We now have sightings of Atlantic salmon in 77 river systems and some evidence of spawning.

The program that is supposed to be looking out over this whole issue is the Atlantic salmon watch program. If you look on the website, you will find figures up to 2002 and no information after that. I don't know. It looks like it has effectively shut down.

Another major area is waste. This is the waste that goes to the seabed. The issue is that too much waste smothers all life on the bottom below farms. A waste regulation was brought in. The only trigger is a singular measurement of sulphide levels. Even the independent advisory body named by government to look at the science behind this regulation, and its effectiveness, said that's not an adequate way of regulating. But that's what we have.

This measurement tells us that the oxygen has been used up by the biological decomposition of fish feces, and that kind of circumstance will kill most organisms. The regulation has had some positive effect because it has, for once at least, brought in some kind of a standard. There are some farms that were in terrible shape — huge benthic smothering. They've had to limit production. Some have had to move.

In the end, it still is not an adequate indicator. The standards aren't tough enough. The regulation fails to consider impacts from other chemicals. The regulation does not include water-quality measures in the water column. It doesn't include sediment standards for metals or other contaminants. It doesn't include examination of pesticides and antibiotic residues. The levels of sulphide that are acceptable in the regulation are far too high, and the levels that are allowed on all farms in B.C. allow for up to 90 percent of the benthic community to become dominated by just six species, and a 50-percent loss of biodiversity is considered perfectly acceptable.

We strongly oppose this level of species loss since it will seriously jeopardize the long-term health and sustainability of the marine environment. The regulation focuses only on local impact to the benthic environment and ignores other risks beyond the vicinity of the farm — the issues that Robert Mountain has pointed out, not just on clam beds but on other species. It does not deal with issues like plankton blooms. It does not address the potential contamination of the seabed around the farms, and we now have a study that shows elevated levels of mercury in rockfish.

It does not examine the impact from SLICE used to control sea lice and its impact on other species. We're having reports from prawn fishermen and shrimp fishermen that SLICE use creates a dead zone right after use, which isn't paralleled in farms that have not had that chemical.

[1410]

The fourth area of regulation is impacts on marine mammals and other species. This is regulated in a fashion, in that the only way you can shoot a marine mammal is by getting a licence from DFO. That's how the regulation works. That's all there is to it. You get your licence, and then you're allowed to. Fish farm operators are the only ones who are legally allowed to shoot marine mammals.

The amount of kills is, again, self-reporting. There has been no audit, no observer programs. So we really don't know what the circumstances are as to how many marine mammals, seabirds, sharks or other animals are killed, by necessity, for the fish farm industry to continue as it is.

I want to touch briefly on an issue that is not regulated at all, and that is the depletion of global fish stocks for use as feed on the farms. The use of wild fish for meal and oil is a major ecological and socioeconomic concern. Farming carnivorous finfish requires an incredible amount of feed that comes mainly from Peru and Chile.

We know from the salmon aquaculture dialogue that a number of us participated in, in the last two days, that Chileans from industry and from environmental groups looked at how many wild fish were needed to make an equivalent amount of farmed salmon. The industry leaders were saying that it takes about four kilos of wild fish to make one kilo of farmed salmon. The environmental economists were saying eight to make one kilo. That simply is not sustainable as far as global fish stocks.

The last area I want to look at is disease and parasite control. We have a sea lice action plan in British Columbia supposedly to make sure that sea lice levels don't get out of hand, particularly during the out-migration of pink salmon. As Craig Orr pointed out already, we've got a trigger of three mobile lice, which triggers either SLICE treatment or harvest. In fact, that is completely unscientific, and scientists like Dr. James Butler pointed out that instead of three, we should probably be at 0.5 or less. We are now below the Norwegian standard. The Norwegian standard now is that two motile lice triggers treatment, and that's mandatory treatment. It has to take place within two weeks.

I took a look at what data there is on how this regulation actually operates in the real world, and what I found is that probably about 20 percent of our farms are not in compliance with the three-motile trigger. There is no action against that. There are no fines, no penalties. As a matter of fact, government doesn't even have data. As a committee, if you were to ask them how many farms went over that three level and where they are, they would have to say to you: "We don't know. We don't keep that data. We don't ask for that data."

If we were to compare with Norway, how would B.C. farms stack up in Norway? Well, I did the math, and about half of our B.C. farms wouldn't comply with the Norwegian standard during the out-migration. About a quarter would be breaking the law during the non-migration period. Where Norway also regulates how much of a lice infestation is allowed in non-migration periods, B.C. doesn't even regulate that. In Norway there are fines of up to \$300 Canadian per day per 10,000 fish, and there is a potential jail time of up to one year. There have been people who have gone to jail.

Norway fully acknowledges that sea lice are having an impact on wild juvenile salmon, and they have moved to protect 37 salmon rivers and 21 salmon fjords. They intend to expand that to 50 rivers, and they have named 13 systems that they want fish-farm-free.

[1415]

In conclusion, it's not very useful to compare with other jurisdictions, but when we do, B.C. is lacking. In general, the rest of the world is not at a very good standard. B.C. is the one place where we've got tens of millions of wild salmon that we need to protect, and we need the toughest standards in the world.

We're not convinced that any kind of regulations that have been used elsewhere or here can stop the impacts from sea lice and disease. We believe that we need to move to solutions beyond tinkering with regulations with open-net pens that invariably allow impacts — and huge impacts — from sea lice, disease and other measures. I'd like to pass this on, talking about solutions.

**C. Stewart:** Jay Ritchlin from the David Suzuki Foundation is going to start us off on this solution front.

**J. Ritchlin:** Thank you for having me and hearing from me again. It's a pleasure to see you all, and I'd like to thank those of you who managed to come to the salmon dialogue. It was a pleasure to have you there. Sorry we couldn't fit more of you in. It was a good three days.

I will talk about a transition strategy to sustainable aquaculture in closed tanks. I've spoken to you on closed tanks and economics before, and once briefly on the broad issues of aquaculture including shellfish. I'll focus narrowly on closed tanks and particularly around transition.

We're talking about a system of farming. In some places it's being used. In some places it's still experimental. But there are strong indications that it can be done in any number of ways that would separate the farm fish from the wild fish.

Again, there are benefits to the environment that are clear. They've been established in trial programs — the elimination or severe reduction of disease and waste transfers and escapes. Antibiotics and other chemical therapeutants are reduced because the fish in the farms are not exposed to the outside waters where they do contract some of their diseases and parasites.

Feed use has been shown to be reduced by anywhere between 10 percent and 30 percent, and that's an incredible ecological and economic savings for the farmers. Of course, wildlife interactions between marine mammals and others are eliminated if they can't get in.

As Craig mentioned, the industry has a severe cost at times from sea lice. This is from a paper published in 2001 that actually looks at the costs to industry from dealing with sea lice infestations. The blue part is their total revenue, and the yellow parts are their reductions in revenue through a severe sea lice infestation period.

Obviously, the abilities to reduce pollution in their pens or disease in their pens, to control for the changes of climate change that may be going on around them, to perfect their husbandry and to eventually get systems in the market — including from groups like CAAR — are benefits to the industry.

The feasibility of closed tanks. While there is not a full-scale commercial salmon model, there are very detailed financial projections and modelling that have been done. There are eco-farm models in Europe and the Faroe Islands that are funded and under construction. AquaOptima is a company in Norway that grows out to varying levels. There are smaller systems that we've seen here in British Columbia. Some of them are raising freshwater fish. There are many non-carnivorous species being grown in closed tanks now, and we've seen a proposal from Agrimarine, which would attempt to put a commercial-scale system here in B.C.

Transitioning to success. I think we've seen established that the ecological benefits of these types of systems are there. We know that some questions remain about the overall financial viability from an industry perspective. We also believe that the overall economic viability from society's perspective needs to be included in the equation, and that includes the external costs that the industry currently doesn't bear.

To get better numbers for those things, we believe that at least two commercial-scale demonstration projects need to be implemented — perhaps more. I do believe that competition between good ideas will help get us the best idea. I would also say that at the current state, we do have at least one that we know has worked very hard to be ready to go. I think the province and the federal government should be doing everything they can to get commercial-scale systems up and running so that we can get the numbers for the financial analysis and the economic analysis.

[1420]

I think the risk of a single test system going up, not working the way it was meant to work in maybe the first year or so and being written off, is not worth taking when we have a great degree of political will and industry interest in trying to find a solution.

We believe that the structured commitment to transition should be built into any pilot projects. So if governments are going to put money up, and then companies are going to come in and use that money, if and as things are demonstrated to work, there should be commitments to then take the next step so that you don't just get money for a one-year pilot project, perhaps get some benefit in that year and then stop it when you've done it. We think if the numbers work and if the systems work, there should be a commitment to transition built into any government public funding.

We think that the regulations to make this happen should start being implemented by next year. We've been calling for this for several years now, and we think that process at the very least should be in place by next year.

I do think that while funding from government is reasonable to advance a publicly desirable good, we would like to see that any proponents coming forward to claim government assistance also bring some of their own money to the table to ensure that it's not just a research and development foray — that people are serious about investing in a serious, long-term transition. That would help us weed out the people who just want to try things for fun from the people who really want to make this a commercial success.

We also think there are some key principles that are very important for public funding that may go into some of these projects. In the package that came from me, there's a one-pager printed with the CAAR logo at the bottom that elaborates on these key principles a bit. But I think they're there and fairly obvious on their own.

Transparency of how the project is going to work and what is going to be attempted. Multi-stakeholder input and oversight from the very beginning we think is critical, because the ability to solve the political dilemma is going to be dependent on all of the parties who have an interest in this knowing what's going on from the start and all the way through to the implementation phase and the testing phase.

We need to demonstrate that the economic viability is achievable. I need to emphasize that that doesn't mean necessarily that the first time it's tried, the industry is going to keep the exact same profit margin they have now. We want it to be financially viable. We don't want it to require government assistance to continue, but we are concerned that the current costs are not realistic because the costs to the environment are not on the books. So if there's a change in profitability, that may be necessary for a short period of time. But some of the modelling that we've seen suggests that this industry, once fully functioning and working out its kinks, could be as economically competitive as an open-net industry.

We need any of these demonstration projects to be able — designed from the start — to show that commercial viability is possible. Small systems with few fish, not very long grow-out and testing procedures — they're not going to give us the information we need to be able to build financial models that can test the variables, see where the sensitivities are and help us find

the ways to make this succeed. I think the solutions are both necessary, but they're also positive in the long run.

Many of you may have recently heard about the report saying that in 50 years, we may have no more commercially viable fish stocks. Boris Worm from Dalhousie University and a member of the Fisheries Centre here at UBC, Reg Watson, were also authors on that.

The report says quite a bit more than that. It's really quite astounding — their conclusions. It is that biological diversity and healthy ecosystems create a positive net benefit to societies and economies. Protecting biodiversity is not antithetical to long-term economic growth. In fact, they're inextricably linked. The paper demonstrates that where you lose diversity, you lose the ability of the ecosystem to buffer against natural disaster, to provide sustainable wild resource-based incomes and to recover from extreme events.

They also showed that as you increase biological diversity, you continuously increase the payback. It doesn't level off and stop. It keeps getting better the more you keep protecting and increasing biological diversity.

[1425]

Finally, these natural buffers aren't just kind of nice, pretty things for us. They create real and insurable value that should be factored into economic analyses and management decisions. These are paraphrased quotes from the paper that's cited up there, but they're very close to the actual quotes that just wouldn't fit on a PowerPoint slide.

We acknowledge that aquaculture is a reality for a variety of reasons — employment, food, new opportunities, the stress on our ocean resources. We also strongly believe that the real problems do exist. We also believe that closed tanks can help us come to solutions to those problems so that we can have a viable industry as well as a healthy ecosystem, the other industries can remain healthy, and the first nations rights and title to their traditional resources can remain available. When we have all of these things in B.C., I think we will truly be a world leader.

Many of us are dedicated to working for change. I know many people in government and industry are also dedicated to change. As you saw if you came to the salmon dialogue, there are people from around the world who are looking at these issues and trying to find out if we can get us all there in whatever way is best for our region and our ecosystem that we happen to inhabit.

I think that's all I have for you. I believe that's the last slide for me.

**C. Stewart:** Well, we realize we've pretty much run out of presentation time, but we have just a couple more brief comments.

Gerry is going to go through funding mechanisms for change. Then we'll just talk about recommendations, and we'll try to keep it as short as possible.

**G. Thorne:** We're pleased to provide you with a research paper on ecological-fiscal reform. We believe that new fiscal policies and the animal called ecological-

fiscal reform, in particular, can help move the aquaculture industry toward sustainability.

When I began this piece, I didn't know much about EFR, as it's called, but I soon found that it's very widespread. Numerous jurisdictions around the world are using ecological-fiscal reform policies to promote environmental sustainability.

We want to provide you with a background on that as a positive contribution towards moving aquaculture toward sustainability. An important area in environmental policy is economic incentives to achieve sustainable development. This includes using economic signals to reward environmentally responsible actions and to discourage those that are contrary to sustainable development.

Ecological-fiscal reforms can be used in combination with other environmental policies to reinforce environmental objectives — tools such as taxation, tax exemptions, credits and rebates, tradable emission permits, and direct spending and program expenditures to green the way people buy, sell and invest in the economy.

EFR can be used in combination with other environmental policies to reinforce environmental objectives. Indeed, in many cases, a combination of policy tools will be needed to best achieve desired environmental outcomes.

As the National Round Table on the Environment and the Economy noted, EFR is a strategy that redirects a government's taxation and expenditure programs to create an integrated set of incentives to support the shift to sustainable development. Most levels of government in Canada have already introduced a variety of fiscal measures to protect the environment and, in some cases, to promote sustainable development. I'm not able to find out if British Columbia has been doing so, but I'm looking forward to talking to some folks in the Ministry of Finance to see if there is any movement towards this kind of policy development.

Under the current federal fiscal regime, there are few fiscal mechanisms in place to help ensure that the costs of pollution are borne directly by those who caused it. Thus, there are currently scant fiscal incentives not to pollute. Canada's Department of Finance states in its sustainable development strategy, 2006, that long-run economic growth is not possible if short-run objectives are pursued at the expense of environmental or social pillars of sustainable development.

Canada's Commissioner of the Environment and Sustainable Development, in her 2004 report, exhorted the Department of Finance to do more to identify those areas where the federal tax system may be acting as an impediment to the attainment of sustainable development.

So two key issues related to EFR policy are environmental externality and market failure. I elaborate on those in the paper that we provided you. Environmental externality, as you will know, relates to environmental damage that results from the consumption and/or production of a good or a service that is not directly reflected in the price charged for the good or service or is compensated for in some other non-price way.

Externalities usually exist because relatively open access to the environment — air, water and land — means that it can be treated as a free receptacle for the wastes of production and consumption.

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Market failure is not a moral failure but an economic idea that's a result when the price of goods and services do not reflect the true cost of producing and consuming those goods and services. Environmental externalities need to be included in the cost of producing and consuming goods and services in order for society to make better decisions about how much of the good or service to produce and/or consume.

This is clearly true in our view in regard to open-net-cage fish farming where the externalities are not reflected in the market price of farmed salmon. The Georgia Strait Alliance and CAAR believe that a variety of these EFR measures are immediately applicable to the aquaculture industry in British Columbia — such measures as polluter pays, environmental tax shifting, a reduction in environmental externalities and market failures, the introduction of feebate and environmental levy systems, capital cost allowances, and market and pricing mechanisms.

Structural changes are required in the aquaculture industry, and the focus should be on integrating sustainable development considerations into policy-making that goes beyond business as usual. We need to move away from current salmon-farming practices and toward environmentally friendly and sustainable ones. Ecological-fiscal reform is a practical tool that government can use toward that goal.

Having said that, we have two recommendations for you. The first is that the committee should encourage the government of British Columbia to undertake a comprehensive study, if they are not already, of ecological-fiscal reform measures leading to a regulatory regime that will see such a shift toward sustainability in the province's aquaculture industry.

Second, we would like to see the committee recommend that the government immediately assess what EFR measures and tools would be available in support of a commercial-scale closed containment pilot program. Such measures will assist in determining with certainty the economic viability of closed containment systems as opposed to the continued unsustainable use of open-net-cage systems.

That's a quick summary of that piece we've provided for you. We hope that's a positive contribution to your discussions. As I said, we look forward to hopefully having some discussions with the Ministry of Finance about whether those measures or these policy issues are being undertaken in British Columbia.

**C. Stewart:** In closing, you've heard a variety of recommendations in various parts of the presentations. I just want to review some of those and add in a few more that CAAR would ask the committee to give consideration to.

First of all, we've talked about the failures in British Columbia's regulatory regime, but in no way are we

recommending that the committee make recommendations around tightening up the regulatory regime for open-net-cage fish farms. We don't feel that tinkering with regulations is going to address the fundamental underlying problem that open-net cages are simply unsustainable in an ecosystem such as coastal B.C., which is so dependent on the health of wild salmon stocks.

We would also suggest that the committee not consider trying to replicate the Norwegian designation of national wild salmon fjords, rivers, etc. The entire coast of B.C. is a wild salmon migratory zone. As Jay just mentioned, in the study done by Boris Worm and others, diversity is absolutely critical to the health of those coastal ecosystems. So in no way would we suggest that one area be designated as an important wild salmon area and another be written off as zoned for continued open-net-cage aquaculture and ongoing destruction and erosion of the wild stocks. We have to maintain that biological diversity in order to maintain long-term health.

What would we recommend? CAAR would recommend that we embark immediately on a program of transitioning to closed contained aquaculture. We should start in 2007 with proof of model. Let's look at what proposals are out there, what technologies have been invested in and look promising, and develop a proof of model for a closed tank facility where we can test the recirculation systems, etc., and see what's going to work and how well it's going to work, and shift from there into a full-scale commercial closed containment trial.

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That commercial level is absolutely essential because in order to make the transition, we're going to need not just the proof of the technology and the analysis of the ecological benefits of that technology; we are also going to need the economic data that is only available once you reach certain economies of scale. So we would strongly advocate that the government be encouraged to invest in this, to seek investment from proponents and to leverage whatever outside funding can be available in order to get a full-scale commercial trial up and running in 2007.

At the same time, we would recommend that the regulatory mechanisms for a transition policy be put in place — ideally by the end of 2007 if not early 2008 — with a time line and an objective of transitioning to closed containment for the salmon aquaculture industry in B.C. by 2010. When the world arrives on our doorstep, we will be truly on a sustainable footing in this field and be able to point to the success of an industry that has made real change.

At the same time, we hope we can address some of the feed concern issues and aim for an aquaculture industry that is a net protein provider, which is certainly isn't at the moment. To start taking us in that direction, CAAR has been working in a framework agreement with Marine Harvest Canada. We have now agreed on the terms of reference for research we will be undertaking into the economic viability of closed containment facilities. That includes methods for quantifying the externalized costs of the current open-net-cage

industry. We hope that research can make a contribution towards the direction that the province and the industry as a whole will take.

In the interim we would strongly advocate that a moratorium be placed on the issuance of any new licences, expansion of the industry into new areas or increases in production on existing farms. We have to cap the industry where it is right now, and if any new farms are issued licences in the future, those should be for closed containment facilities.

We strongly encourage this committee to make a very, very powerful recommendation around the need for transparency in British Columbia. It is becoming increasingly evident that we will no longer be able to seek solutions if we can't have all the information openly shared and on the table.

We do understand that some industry information is proprietary, but we think that our government that represents the people of British Columbia and the people of Canada should certainly be able to provide us with the information that they have.

It's embarrassing, quite frankly, to attend forums like the salmon aquaculture dialogue where the Canadians are always in the position — unlike our colleagues in Norway and Chile and the United States — of having to say: "We can't get the information. We don't know what's going on. Our industry and our government won't work with us in that way."

I think we saw a very good example of the type of constructive dialogue that can take place during this SAD meeting when SalmonChile, the industry association, and Terram, an environmental group in Chile, stood together and did a joint PowerPoint presentation around interpretation of the feed-conversion ratios in the Chilean salmon-farming industry. They didn't agree on the outcomes, but they were all using the same input. Everybody had access to the data. It's the hope of that dialogue and of the participants that the transparency of data will bring us closer and closer to agreement and shared understandings of current status and where we need to go.

It's going to be a constant obstacle in this province and in this country as long as the data are held in confidence by our own governmental representatives. We would urge you to strongly advocate for transparency as we move forward trying to seek solutions.

Finally, we just want to stress what an opportunity we believe we have in British Columbia. Internationally there is a growing green market trend, and huge corporations such as Wal-Mart are examining their seafood sustainability policies. The demand is there in the marketplace. The more programs we see like Oceanwise, SeaChoice, FishWise and the Monterey Bay Aquarium program, which identify for consumers the most sustainable seafood choices, the more we are going to see the retail market responding.

We are uniquely positioned in British Columbia to start moving now to be the jurisdiction that will fill that market with ecologically appropriate farmed salmon from closed containment facilities. We can be there by the time those policies are in place at the global retail

level to meet that market demand. We sincerely hope this committee will strongly recommend we move in the direction of that type of sustainability.

Thank you very much for listening to us all. We appreciate your patience. We know you've heard much of this before, and we welcome your questions and discussion.

[1440]

**R. Austin (Chair):** Thank you, Catherine. Scott is going to have the first question, seeing as he has to catch the first plane.

**S. Fraser:** I was trying to get on a later flight, but I've just been told that it's not going to work out. So I'm going to have to be very quick. I may have to leave one of the answers here till after I leave, so I'll have that passed on.

Craig, to you. The graphs you showed are quite small on the PowerPoint that we have here, but on the screen it was much more obvious. The returns in the various rivers and the trend are quite striking and quite clear — the drop that we've seen.

We just had a meeting yesterday with DFO. The graph is not as clear. It's quite confusing, but I did find that Kingcome Inlet is on both of these. There's a single graph here and a graph here. The vertical index on the DFO model seems to be a different scale, I think. Can I leave this with you and have you...?

**C. Orr:** Sure. I think one of the answers is that they're probably showing you the even-year returns, and I showed the odd-year returns. They have to be considered separately. The even year is a strong year of returns. The odd year is the weak year of returns.

**S. Fraser:** Oh, all right. That answers that question. Thank you so much.

We'll have many more, but the last question I'm going to do is directed at David, and Gerry to some extent. It's that feed ratio. We get different numbers all the time, including this morning — a substantially different number of ratio of feed — on the amount of kilograms of feed required to create one kilogram of farmed salmon. This morning the explanation was that the numbers are inflated. They claimed a ratio of 1.2 to 1, I think, and it was from fish that had no value. They're bony fish; they couldn't be eaten.

First of all, Gerry, I'd never heard of including into the analogy of that ratio — the inclusion of diesel fuel and everything to make the feed.... That's an interesting thing. But 4 to 1 or 8 to 1, David, are the numbers that you came up with.

**D. Lane:** This is what the Chilean salmon-farming industry and their environmental counterpart came up with. It's interesting what they did. They came up with a common methodology so that for all the numbers that get input into the economic equation, the factors were identical, but they each had different sets of numbers. The environmental economist had just published government numbers, and the industry had a

different set of numbers that were their own. So they came up with 4 to 1 and 8 to 1.

The Canadian industry has been a leader in reducing the amount of fishmeal and fish oil, so they've done better than 4 to 1. But from figures I've got from them, they might be at a level of about 2.75. Now, that's still a lot of wild fish to produce one kilo of salmon. That's almost three kilos of wild fish to produce one.

My challenge to the industry would be to hand over its numbers to the Chilean industry economist and the environmental economist. Let them put them through the exact same analysis, and let's see how Canada stacks up.

**S. Fraser:** Okay. To finish off, if we're looking at 2.7-something to 1 — if that ends up being the ratio — then that does bring in the question of sustainability. Eventually, there will be a reduction in wild biomass to create farmed salmon.

**D. Lane:** That's the issue.

**S. Fraser:** And that would also be an issue in closed containment, would it not?

**D. Lane:** That is an issue that exists with any kind of farming with a carnivorous species.

**G. Thorne:** The idea that the feed industry only uses junk fish is, frankly, ludicrous. We know — and you can look at Professor Rees's paper — the calculations of the kinds of fish that are being taken out of the southern oceans to....

[1445]

**J. Ritchlin:** I just want to jump in here, because I was in the meetings of the internal discussion of these in the last couple of days. The Chilean numbers were specifically intra-Chile, so the about-4-to-about-8 debate was Chilean numbers only. The global numbers are one thing, and then the Canadian numbers are another thing.

I just wanted to mention that some of what Professor Rees's paper does is on a global level, and while the issue still applies in Canada, it's not all exactly the same. I just want the committee to be clear on that. CAAR was clear on that — that those 4-to-8-to-1 numbers are intra to Chile.

One of the reasons they've come up with is that for the first time we've agreed that fish oil, being a limiting factor, needs to have an additional counting of its own because the fishmeal that you get when you grind up reduction fisheries fish doesn't produce enough oil to satisfy the industry. There is in fact an additional pressure to get the necessary amount of oil. That's what SalmonChile and the Terram Foundation agreed on for the first time ever at this dialogue meeting — that it was in fact appropriate to count the additional resources necessary to get the oil required for the industry.

Sorry. I didn't mean to interrupt, Chair, but I just wanted to make that very clear.

**G. Coons:** Thank you so much for coming in today.

David, you mentioned the advisory group about the waste control regulation that came in, in 2002. It's on the website and their notes from the meetings. I found it fairly critical. Also, when this advisory group — Drs. Bright, McKinley, Mazumder and Pedersen — was tasked to give independent scientific advice to the government on the regulation and came up with a key one.... You talked about that. They had concerns with the sulphide measurements and thresholds.

Also, in one of their reports they looked at the critically important issues not addressed under the regulation, which were the cumulative effects not addressed within the framework. It was okay for managing individual operations, but looking at the mass.... Again, other concerns they had, as you know, as the transparency and the monitoring data made public, and research on hard substrates.... Do you think we need to go back?

As Catherine said, we shouldn't be recommending looking at the regulations. We will make recommendations, and the recommendations to the government will be enacted, or they may not be. Do you think that regulations should be revisited or not?

**D. Lane:** Right now we're living with an open-net-cage industry that has regulations to mitigate environmental harm. Those, in the interim, should be improved on — particularly the issue that you brought up of cumulative impacts. That's what we're seeing in the Broughton, and in my mind, that's what's leading to the contamination of the clam beds and other first nations resources, which is not included in how the waste regulation currently stands. Those kinds of improvements need to be made in the interim. As a matter of fact, they are reviewing that regulation next year. Every five years they pledge to re-examine it.

**G. Coons:** That was one of the recommendations. The SAG said that it should be introduced as an interim reg with a three-to-five-year maximum longevity to look at science gaps.

The other thing that I want to comment on. We had DFO present to us and talk with us yesterday. They gave us their state of knowledge reports and studies. The knowledge gaps are just considerable in all frameworks of the impacts between farmed and wild fish as far as waste and chemicals and disease. They mention it's going to be years and years of study before they get onto these things.

We also talked about the precautionary approach that they're using. DFO has used the precautionary approach in the context of aquaculture and will be informed by the Oceans Act and federal direction regarding risk management. Do you think we're getting the appropriate federal direction as far as the precautionary approach?

[1450]

**J. Ritchlin:** Our understanding of the latest federal cabinet directive on the precautionary principle or

precautionary approach was to unfortunately render it much more like traditional risk management than the spirit and intent of the precautionary principle, which is when you have a reasonable likelihood of harm — which I think Craig and others have demonstrated quite well, that we have a reasonable likelihood of harm — you should not use the absence of absolute proof as an excuse for inaction. In fact, you have a responsibility to act in a precautionary manner where that reasonable likelihood of harm exists.

Unfortunately, we're back to a much more.... Burden of proof is on — I don't know who — I suppose, the environmental groups or the ecosystem to prove that it's collapsing. Then you get into an argument over how much collapse or how much harm is okay until some day when we might have final proof. From our point of view, that's an incorrect approach.

**C. Trevena:** I've got a couple of questions. First, just generally, we had the Salmon Farmers Association present to us this morning. One of the things they said, talking about closed containment.... It's a very interesting discussion. The industry is very much aware of closed containment, aware of the risks that are out there, and possibly would like to see closed containment if it was commercially viable.

But one of the things that was raised — I'll come back to that in a second — was: how do you define closed containment? What is closed containment? So I ask you: as CAAR, what are you defining closed containment as?

**J. Ritchlin:** We've had four pilot projects in British Columbia that were run about four years ago. All of them used some level of physically separating the farmed environment from the wild environment. At the very least, the vast majority of solid waste has to be captured and removed and not allowed to go into the system. There needs to be physical separation to the greatest degree possible of the wild and the farmed environment so that fish escapes and marine mammal interactions are eliminated.

In terms of disease transfer, parasite transfer — the possibility of those vectors going in either direction — you'd have the ultimate amount of control possible on that and the ability to completely separate in an emergency situation. I understand that because of energy consumption issues, there will be some systems that are not 100 percent closed and recirculating. But the balance between the energy footprint and the ability to test and demonstrate that those vectors of disease and parasite transfer are, if at all possible, eliminated — and if not totally eliminated, then at least provide the ability to stop the exchange back and forth in an emergency situation.... To me, those are some of the elements of a closed system.

I don't know what the perfect terminology is, whether the argument between climate change and global warming.... I don't know the best possible answer, but I think that every system that has been tested so far demonstrates an acceptable capability to achieve

those goals and represents a quantum leap from what an open net cage is. Even the systems that don't have 100 percent recapture, for example, of their waste water do have the ability to stop and enclose production if an emergency comes into play. Yes, that puts the financial burden back on the farmers, but in our opinion, that's where it belongs.

**C. Trevena:** As your recommendations, you suggest two commercial-scale projects — at least two — that that's a start and that we could get two going. Would you see these as independent or done in partnership with one of the companies to make it actually commercially viable because you have to produce the fish and then process the fish?

**J. Ritchlin:** I don't think commercial viability demonstration is dependent on the participation of a major fish-farming company. It's dependent on the size and scale of the operation and the ability to generate a number of factors that can be plugged into the modeling equations with enough detail and enough data to create projections and test the sensitivity of different factors.

[1455]

For example, what are your feed costs? What are your oxygen production costs? What are your energy costs for running the system? To be able to average those over an appropriate scale, you need a large enough system, something at least a quarter to a third of the size of the standard net-pen farm we have in British Columbia — maybe four to six nets' worth of fish production in quantity terms. Some of the due diligence work that we've seen done would provide an adequate demonstration of data to provide those types of analyses with what they need.

**C. Trevena:** To do a commercial test run, as it were, you'd have to do it.... It wouldn't just be over one year. It would have to be over a couple of years, because getting fish into the system and letting them grow out, and so on, would take....

**C. Stewart:** Eighteen months at least.

**C. Trevena:** ...18 months.

**J. Ritchlin:** An 18-month grow-out cycle would probably provide enough detailed information. It might take two grow-out cycles, but if you have enough tanks or whatever closed system that you use, you can rotate stock through them. Then you can start to get a very good idea of what it would look like in an actual farm when that type of production was underway.

**C. Trevena:** Gerry raised the issue — the nightmare reading — about the fuel costs. If we're looking at closed containment, we are looking at a different level of fuel costs. We are going to be having more power generation, more power being used on the site of the closed containment. Has there been any modelling done about basically the increased CO<sub>2</sub> emissions,

potential CO<sub>2</sub> emissions, by having closed containment compared to having lots of small sites — another impact on the environment there?

**D. Lane:** Maybe I could answer one aspect of that. In the closed containment discussion, there have been a number of notions about putting a farm, say, out in the Broughton Archipelago. So you've got these huge power generators, and you're dealing with this and that. The ideal model is putting it in Port McNeill or putting it in Port Hardy, attaching it to the power grid — just our regular B.C. Hydro — attaching it to the sewage system and having it right next to a fish plant. Those are the kinds of economies that you can do when you don't have to be off in a remote wilderness because current net pens require that.

**C. Stewart:** Plus, you reduce your fuel consumption costs in transporting crew, feed and everything back and forth to remote sites. Presumably there would be a balance between being on the grid and the energy consumption associated with closed containment versus off the grid and the energy used to power the farm when it's off the grid, and also to transport goods and services back and forth as well as move the fish.

**J. Ritchlin:** I think one of the reasons that we need to run these demonstration projects is to get some very good numbers on that thing. Of course, as environmentalists we're concerned about carbon dioxide and global warming. The additional savings in feed are another place where the energy analysis needs to look, because if you save 10 percent to 30 percent of your feed by using a closed system, you reduce quite a bit of your costs but also quite a bit of the carbon dioxide footprint that salmon farming has.

As other Rees analyses showed very clearly, and as Peter Tyedmers at Dalhousie University on the east coast has shown, the footprint of salmon aquaculture is far greater than the footprint of wild-capture fisheries. In part, it's because all of the energy of wild-capture fisheries, times 2.75 and up to 8, goes into fish farming. You have to catch the fish first, then use the energy to turn them into feed and then grow the fish. So every time you reduce the feed use, you also help reduce that footprint.

As well, the systems that are often used to compare the energy consumption.... For example, the original Agrimarine trial program in Cedar on Vancouver Island was a land-based system with 30 feet of pumping head and not built out to a large economy of scale. It used far more energy than it needed to use. CAAR projections are that the energy consumption of a floating tank system would be about 1 percent of the cost of running the system, down from something like 12 percent or 13 percent when it was a land-based system.

[1500]

The technology has never been optimized in the trials that we've seen here in British Columbia. They trucked in liquid oxygen, which is perhaps one of the most expensive ways. A lot of energy consumption is going there, as opposed to using on-site generators, where you can use that for sterilizing your water, pro-

ducing your oxygen and running that off the power grid instead of running a diesel generator out in the middle of the coast somewhere.

I think it's a reasonable and important question. I have several lines of modelling that suggest to me that some of the closed systems out there will perform fairly well when all of the energy inputs are taken into account.

**C. Trevena:** My other set of questions is for Robert — I think it's you — around the UBCIC resolution. It doesn't actually mention closed containment as a specific....

Interjection.

**C. Trevena:** Does it? Not in what it's resolving. It's asking for support of a moratorium on open-cage finfish sites, expansion of existing sites, adequate framework for consultation and accommodation, but in the resolution it doesn't call specifically for closed containment.

Obviously, the tribal council is very determined that they want closed containment. I wonder if you could explain how this can be resolved and how the two work together.

**R. Mountain:** Work together with the Union of B.C. Indian Chiefs on closed containment?

**C. Trevena:** Yeah. Well, the UBCIC resolution on the fish farms doesn't actually specify that it's got to be moved to closed containment. It just says a "framework for consultation and accommodation."

**R. Mountain:** Yeah. We did do a presentation with the Assembly of First Nations and the First Nations Summit. The Union of B.C. Indian Chiefs has never seen that closed containment piece. They have to be informed about what it is first, before they can pass a resolution on it. We'll have to do that — show it to them. But the Assembly of First Nations and the First Nations Summit all have seen that closed containment.

**C. Trevena:** The tribal council is very determined that it's going to be closed containment, that this is what you want in your territories. You're obviously working with CAAR on this, as part of CAAR. How else are you working to attain this?

**R. Mountain:** We have been in contact with Richard Buchanan, and he has informed us of what he's doing. We also had presentations on the closed containment systems. We believe that because of the closed containment, there won't be any disease or parasite transfer and stuff like that, and on the contamination of our beaches, there wouldn't be any of that waste going on there.

It took us years to convince our community that this was the way to go, and a lot of the elders still do not believe they want them in our territory — period. To get them to this point was very hard. They have seen the system. If it can work, fine. It's better than having the open-net-cage systems in our territory.

**C. Trevena:** Is this an issue that's coming up at the table with treaty negotiations?

**R. Mountain:** Only one band is in the treaty negotiations. Right now the 'Namgis band is all for it. They're putting a lot of money towards a lot of that, and they said that they would have money at the table for the treaty.

**C. Trevena:** For closed containment.

**R. Mountain:** For any type of research to help, and closed containment is part of it.

**C. Trevena:** Okay. My final question. Thank you for your indulgence. Do you know, on the clam beaches, how long it will take to remediate them, to get them back to their natural state? Have you any idea of how long that would take?

**R. Mountain:** That would be hard to say, because as you've seen from the pictures, some of those beaches were over two kilometres away. So you're seeing over 20 years of contamination on our beaches. We know that some of our sites where they had relocations, Carrie Bay and Baker Island.... We've seen dive videos of those areas, and they've been fallow six, seven or eight years, and they still haven't come back. So we're not sure if it will come back.

I read one of DFO's reports on Carrie Bay. Even their scientist says that they don't know if it will come back, so we're not sure.

[1505]

**G. Robertson:** Thanks for your presentations. It was a myriad of good coverage on the issues. I'm curious on the feed question. This morning from industry we were told that two of the feed companies represented here are in Peru. The Chilean industry is supplied from a Chilean source. They consider both of those to be United Nations FAO-certified as sustainable fisheries, and they sort of stake out the ground that actually the feed they're using — fishmeal and fish oil — is sustainably harvested.

Do you have any comments on that in terms of whether you're learning anything other than that?

**J. Ritchlin:** The Peruvians have actually made some significant advances under incredible pressure, having witnessed the near collapse of their fisheries a couple times when they overfished at the same time that there was an El Niño year. They're attempting to do some third-party monitoring of their fisheries through SGS certification systems.

I would say that the ecological impacts are still not being addressed. They're still operating on a maximum sustainable-yield basis. The FAO does not certify fisheries. FAO has a code of responsible conduct, but they do not offer certification as an FAO-sustainable fishery. That's one comment on that. Chile also imports a bunch of its fish oil from Peru.

Canada does have one of the better records in the world's jurisdictions of substituting out fish oil and fishmeal. Of the major farming jurisdictions, we're one of the better ones. In part it's because we don't have the same rules as Europeans do. We're allowed to use animal by-products and many different types of grain, including GMO grains if they're available, and we obviously have easy access to those products — fishmeal, feather meal, blood meal, bone meal. These are all acceptable in Canadian fishmeal formulations. We also use some of the trimmings from our processing plants in Canada.

Nonetheless, the sustainability of any of the reduction fisheries that supply these is far from established.

**G. Robertson:** In terms of standards, when you compare Europe to Canada in terms of what can go into the feed, does CAAR have a position on what is acceptable in terms of animal by-products or GMO ingredients?

**J. Ritchlin:** One of the CAAR's standard asks is that genetically modified organisms not be utilized in fish farming. On the other issues we have not developed a formal policy.

One of the issues I did want to address was an earlier question. The 1.2 figure that you were given this morning on feed conversion.... I must believe that they are talking about the weight of feed to the weight of fish as opposed to the weight of wild fish that goes into the feed to the weight of fish that is produced on the farm.

It's a very significant difference. It happens frequently. We're very committed to being sure that we talk about the amount of wild marine ecosystem resources that go into the feed, not the weight of the feed pellet once it shows up at the farm.

**G. Robertson:** At this point, are genetically modified organisms going into the B.C. farm salmon?

**J. Ritchlin:** I can't answer that with any certainty, because tracing the feed products is not open knowledge at this point. That would potentially be another recommendation to label that feed as to its constituent parts and have some chain of custody reporting requirements.

But we do know that canola and soy are being used in significant proportions in Canadian feed formulations, and we also know that quite a bit of the canola and soy in Canada are grown with genetically modified crops. I can only hazard a guess that that is possible, but I have no direct information.

**G. Robertson:** Second question is related to what you brought up with closed containment operations potentially being sited close to communities — for example, adjacent to processing plants, whether they're in Campbell River, Port McNeill or Port Hardy.

Has CAAR had any direct dialogue with mayors of cities where there are workers in the processing industry? Are there concerns about whether the farms are sited there versus in adjacent territory?

[1510]

**J. Ritchlin:** At this point only with the mayor of Campbell River, who came out to support an Agri-marine proposal to get some economic development funding from the city of Campbell River.

**G. Robertson:** But there hasn't been expression of interest from other communities at this point.

**C. Stewart:** We spoke during the SAD meeting to representatives of the mayors who were in attendance about the possibility of setting up meetings with the communities, with the mayors to talk about closed containment and longer-term solutions as well. That is something we intend to pursue. At this point that dialogue has been casual and infrequent at best, but we would like to formalize it.

**R. Mountain:** There's been talk, too, in Alert Bay and even in Gilford that if it went to closed containment, we would put our people to work in Alert Bay and Gilford.

**G. Robertson:** So that changes the context in terms of the interest of your people, whether you would engage with industry versus oppose?

**R. Mountain:** Yes, we would work in partnership with them, I think, when our board got together. It wouldn't be working for them. We would more or less be partners. But that's a long way away, I think.

**G. Robertson:** The rationale that the committee has heard, I think repeatedly, around being able to locate sites adjacent to communities is: "Well, then all the farms will be in the U.S., in San Francisco and L.A. and down south, where the market is." Do you care to comment on why that may or may not be possible?

**G. Thorne:** Temperature.

**C. Stewart:** The water temperature would be completely inappropriate for growing salmon, which are a cold-water species. The pollution levels in Long Beach harbour, etc., would be off the charts. You wouldn't be able to grow a healthy, consumer-desirable product in those environments.

**G. Robertson:** One more question around the discussion this morning with the Salmon Farmers Association. Primary in their recommendations to the committee was that B.C. maintain the most stringent regulations in the world — and an assertion that that's what we have and what they want to see maintained, not increase.... My impression after this morning was that industry is kind of holding firm and that there is not a whole lot of engagement in where we go from here, which is confusing to me. Why are we sitting here? Why has this whole situation developed to this point if there is not a need for change?

I'm concerned that what we heard this morning from the Salmon Farmers Association was status quo and that more and better communication is required

from government to shore up the weaknesses, and that environmental organizations, first nations and the commercial wild fishery industry have been unreasonable.

My sense, though, is that in the Marine Harvest-CAAR dialogue, that's not where things are at — that there is more progress maybe away from where the committee sits at this point, that there are conversations happening that are looking ahead and looking forward, and that there are some solutions in the works.

Is there a magic formula to what you're doing, which the committee might learn from?

**C. Stewart:** Perhaps part of it is the global perspective of some of the companies that are operating in British Columbia. Marine Harvest is headquartered in the Netherlands. If the merger with Pan Fish, a Norwegian firm, goes through, then they'll be headquartered in Norway, obviously. These firms are operating in numerous jurisdictions — in Scotland, in Chile — and they do have a global perspective. They're dealing with different levels of government and scientific acceptance of the realities of the problems associated with open-net-cage farming.

[1515]

It would not be a stretch to imagine that within an international corporation such as Marine Harvest — which is dealing with regulatory regimes in countries like Norway that openly acknowledge the existence of the sea lice problem, the escape problem, the waste problem — that would filter down through the corporation to the local level.

I think that people in the Salmon Farmers Association who work on the farms and people who work in the communities or in the processing plants perhaps don't share that same global perspective and are encouraged by regulatory agencies in Canada, such as the Department of Fisheries and Oceans and the Ministry of Agriculture and Lands, to perpetuate the state of denial that the problem exists and to continually challenge the validity of the science and the need for change.

We hope that by working in dialogue at an international level with all of these companies through the salmon aquaculture dialogue process and then here in B.C. with Marine Harvest, we can help to facilitate a change both in attitude and in practices on the ground here.

**C. Trevena:** I'd just like to quickly follow up on something that Gregor asked about, and it's the old, hoary one — the issue about moving the farms, and that if we went to closed containment the farms would move south of the border. You cited California. Why wouldn't they move to Washington State? It's still cold water. It's right in the American market. They wouldn't have to deal with any border issues. You know, they're international companies.

**J. Ritchlin:** They also have a trained workforce, processing facilities in place and shipping arrangements here. You know, Washington State has not been amenable to permitting farms on its coastline either.

There is, of course, always going to be transition and change in any industry, including this one. Our forest industry has gone through it. Our pulp and paper industry is going through it. Our fish farming industry, I think, should learn from some of those examples and become cutting edge, grab the niche while it can and establish itself now.

**S. Simpson:** Thanks very much for the presentation. A couple of things in relation to closed containment. First, at the dialogue, Catherine, you were speaking along with the Marine Harvest representatives about having brought a set of terms of reference pretty much to completion around the issue of closed containment — some kind of piloting, or what that might look like. Can we get hold of that?

**C. Stewart:** Terms of reference for research on the economic viability. I imagine so. We would have to consult with Marine Harvest, but I'm pretty sure we could.

**S. Simpson:** That would be great if you could do that and if that information could be made available to us, because I think we'd be interested to see what that piece of work might look like. If it was an agreement reached by CAAR and the largest player in the industry today, what that might look like may help to inform some work we have to do.

In terms of the position of CAAR around closed containment pilots and what that might look like, you spoke about doing two pilots. What kind of time frame are you thinking of? I mean, in some of the musings of the committee — and the committee has made no decisions — we've talked about a year or two years to be able to do that properly. Have you thought that through?

**J. Ritchlin:** We know there is one proponent who, if all funding was in place, would be prepared to start putting fish in the water next year — demonstrating the technical feasibility with a single tank and moving into a four-tank system that would show the commercial viability. From the time all that was in the water, we presume, it would be 18 months to two years before we had some very significant results that could be analyzed. That's the quickest time line that I know of.

**S. Simpson:** Let's just make an assumption that that decision went ahead and that piece of work was done. What would the position of CAAR be on what happens to the industry in the two years while we're coming to determine whether in fact closed containment works or not?  
[1520]

**C. Stewart:** Don't increase production. No new farm licences. No expansion of the industry. Freeze it at its current production levels and current number of farms.

Ideally, we would certainly like to see a significant increase in scientific research around the impacts of open-net cages. Migratory routes were something that we mentioned for wild salmon. Certainly, the first na-

tions have been advocating pretty strongly for some research into impacts in their territory to add to our knowledge.

Potentially, if we find that closed containment is economically viable and the industry is on a transition path towards embracing that technology, then we could start using the studies that we have been undertaking during the two-year period to work towards mitigation and restoration.

**S. Simpson:** One other question. You made reference early on in the presentation about DFO's sea lice communication plan. Could you elaborate on what that communication plan is?

**C. Orr:** It's a fairly extensive written plan to deal with all the public concern about the sea lice situation in particular. It was specifically around sea lice. I believe it was written by Diane Lake of DFO, who is the author of that plan.

It was basically instructions to DFO employees on how to deal with questions surrounding sea lice and the impacts of sea lice. Unfortunately, it was geared towards promoting the fact that we need more research before we can say anything definitive. It was geared towards promoting uncertainty around the link between salmon farms and sea lice.

Does this committee not have a copy of that communications plan? I can certainly supply that. It's been widely circulated. It's not a secret anymore. It was obtained through the federal access-to-information protocol.

**S. Simpson:** It may be in the 1,400 documents that we have, but we could use it again.

**C. Orr:** Yeah. It may well be.

I'm summarizing. I don't have it right in front of me. I mentioned earlier in a presentation that it harkens back to the role that the communications branch has taken over — in certain federal agencies, anyway. It harkens back to the problems we had with the cod collapse on the east coast, where some brave scientists at the time analyzed all the problems in communicating what the actual science says and why the science didn't seem to get to the management stage in terms of the overfishing of cod.

These scientists wrote a paper in the *Canadian Journal of Fisheries and Aquatic Sciences* in 1997 called "Is Scientific Inquiry Incompatible with Government Information Control?" They wrote a very scathing critique that the communications branch had taken over communicating what the science was and spun it to fit policy.

That's exactly what the sea lice communication plan was designed to do. It was a bit of a devious document, I must say, if I can go that far in terms of how the negative publicity around salmon farming should be spun.

**S. Simpson:** We met yesterday with DFO. I think it was Dr. Brian Riddell who was the primary presenter to us on the issue of sea lice. Obviously, there was some discussion around the most recent publication

around sea lice done by Marty Krkošek, Alexandra Morton and John Volpe.

One of the things Dr. Riddell said was that the reality is — I think this number is correct, and somebody will correct me — that somewhere between 50-to-70-odd percent of the fish don't come back anyway. For some reason or other, they're not coming back. They don't return.

The basis of his argument is that we simply don't know. There isn't the information there, really, to clearly tell us what percentage of that lack of fish returning is related to farm-based sea lice and what is related to all those other things that may result in the demise of those fish. I'd just like you to comment.

[1525]

**C. Orr:** Let me speak to that. While that's true, it's much more apparent in terms of impacts on individual fish from sea lice. It's much easier to prove that there are impacts on individual fish. There are other mortality factors. There's no question about that whatsoever.

There's also something in ecology called compensatory mortality. So if you're not killed by one thing, you may be killed by something else.

We have introduced a new form of mortality in coastal waters that wasn't in coastal waters 20 years ago. We used to separate the adult fish, when they were coming back with sea lice, from the juvenile fish. There used to be a clear separation. Juvenile fish did not have to go by adult salmon on their out-migration in the springtime, because they were all in the high seas, and they didn't come back until the fall.

We've created a new form of mortality which, as Marty Krkošek has shown, can infest between 9 percent and 95 percent of all the juvenile fish that go by the salmon farms. It is true that we don't know what the exact mortality is, but I also point out that there is a recent master's thesis out of Dalhousie by a student named Jennifer Ford. It's what's called a meta-analysis.

What she has done in this master's thesis — and she has just submitted this for publication now, so we may not be able to get hold of this — is examined fish population trends around the world, wherever there has been salmon farming. I've seen her abstract, and she has shown very clearly a link between the demise of wild salmon populations and the advent of salmon farming around the world. So these patterns seem to be inextricably linked.

I'm not surprised if DFO hasn't seen that study yet, because it is only a master's thesis, and it wouldn't be very convenient to trot that out anyway. I think what she has shown, working at Dalhousie University, is very clear evidence on a global scale that where you have salmon farming come into an area, you have impacts on wild fish that we have not seen before and at a scale that we have not seen before through other forms of mortality.

**S. Simpson:** One last question. Alexandra Morton presented to us in Sointula. In some of the discussion we had, we talked about siting issues and whether there are other approaches to siting.

I'm wondering, because I know there has been a very large focus — and understandably so — on the

Broughton because of the heavy concentration of farms: has there been work done in other areas where there is less concentration of farms and less impact to try to determine whether there are significant differences in the impacts simply because of the numbers of farm fish there?

I assume that might look a lot like the year when there was some fallowing in the Broughton, and there was a reduction in the number of farm fish there to just generally have an impact. I ask this because, clearly, part of the discussion and part of what we're hearing are questions around siting issues and whether there needs to be a rethink on the siting of farms. The Broughton is an obvious place for that discussion because of the important role it plays in migration.

I'm wondering whether there has been any work done looking at what kinds of volumes in the Broughton versus other areas, where maybe there are fewer farms... Or has that work been done?

**C. Orr:** There has been sea lice monitoring in other places on the coast. There has been some down in Clayoquot Sound by the Ahousaht First Nation, and we have not been able to see those data so far. You may be able to have access to those data, but we haven't seen those, so we don't know what the infestation rates are.

If you talk to Alex, she has been working outside the Broughton as well, down into the Bute Inlet area. I believe Gerry can confirm that. There's a paper she has submitted with some of her academic colleagues, which shows fairly high infestation rates in some other areas around salmon farming as well.

I think you need to generalize a little bit in terms of impacts. You can go back to Marty Krkošek's work, which he just presented this week. Marty found that these footprint impacts from these farms were extensive. He found that sea lice on fish were elevated above background levels for 30 kilometres past these farms. So for 30 kilometres he could detect the footprint impact of that farm. This suggests that these farms have very broad impacts. They're not just localized impacts.

[1530]

I can't think of any hypothesis to suggest that a farm in one area wouldn't have the same kind of impacts as a farm in another area. What we don't have a clear idea of, though, are cumulative impacts. We haven't strung all that together. It is very dependent on the numbers of fish in those farms and on the treatment patterns and the age of the fish in those farms. Those do vary depending on the cycle of the farms, where the farms are located and the various companies. The impacts of sea lice will vary with those conditions as well.

**J. Ritchlin:** Just a brief follow-up to that. I would say that we've maybe created a bit of our own trap in raising such awareness first and focusing it on the Broughton. Most of the research dollars and research effort have gone into that area, and nothing on the scale that has happened there has happened in other areas.

I do believe there's a paper in press starting the process in the Quadra-Cortes area. You start with the initial looking for lice loads, and then you continue through the process of testing the relation to the farms, testing the mortality on individuals and then testing the impacts on the population. That's the series of papers that we've seen published on the Broughton. That's just starting in the Quadra-Cortes area.

**D. Lane:** I'd like to add one other comment. On your comments coming from DFO.... Two things strike me as very odd here. One is that Brent Hargreaves is the DFO researcher who has done the most research on juvenile wild salmon. Was he present, and did he...?

**S. Simpson:** Yes.

**D. Lane:** I'm surprised he wasn't the main presenter. At a meeting of sea lice scientists — some from DFO, some independent, some from various academic institutions — just over a year ago, Brent got up and said that on the basis of his research, it was clear that sea lice from farms are a major source of the problem. He said: "The only question in my mind is to what extent." I'm surprised that that kind of statement was not forthcoming in yesterday's session, because he was very clear about it at the time.

The other thing I'm surprised about is what seems to be an attitude from DFO that there could be any number of reasons why the pink salmon have been impacted. DFO has had the resources and the money to actually examine that question and come to some conclusion. They've spent millions of dollars, and yet they have not formulated one study that would say: are farms the source of this problem?

The research that Brent Hargreaves did was an extensive monitoring of wild juvenile salmon, but in reporting out on that, DFO made it very clear that this study was not designed to look at the impact from salmon farming. There seems to have been a concerted attempt to study almost anything except for the main controversy here — salmon farming and the impact of lice from farms onto wild juveniles. It's sad, because those resources probably could have given us an answer and some clarity for making the kinds of decisions that need to be made.

**S. Simpson:** Let me just comment on that a little bit. I think, to be fair to the DFO people — the folks from DFO — they had some acknowledgment that yes, sea lice may be playing a role in this. What they were saying is that they didn't think there was evidence that it was the primary concern or issue.

This would be a note — that very early, in the first presentation of many, the comment was made.... This was largely related to fish health. That was clarified. It was not in relation to sea lice in particular but in relation to fish health generally. They did tell us very early in their PowerPoint that there was no evidence that fish farming had contributed to adverse impacts on the wild fish population.

**C. Orr:** That's why we did start off this morning with the convener's report from all the European research. They have gotten beyond that stage. Peter Heuch was here in 2003 at a workshop at UBC. He said: "Why are you people still debating whether sea lice from fish farms are a problem? We acknowledge that they're a problem. We're trying to deal with it, and you guys should get to that stage."

We keep hearing this from the Europeans, and we hear different things from the federal government. Those things have to be taken into consideration when you're trying to determine the veracity of the problem here.

[1535]

**R. Austin (Chair):** The final question is from John.

**J. Yap:** Thanks for coming out to present to us. My lead question has already been covered regarding the sea lice question and DFO's scientific research on this issue.

I'll ask it this way. Yesterday we had, much like this setup, a gathering with a number of presenters. Many of them were PhD scientists. Dr. Riddell, on behalf of a team including Brent Hargreaves, said to a direct question that there is no evidence that sea lice from salmon farms infect migrating pink salmon to an extent that causes mortality — or words to the effect that there is no evidence.

Then, Craig, in your presentation and series of slides, you had a slide that said that clearly, based on the evidence of your research, that is a causality. So here we are, laypeople trying to discern between different conclusions from different groups of scientists. I'd like your perspective on how we do this.

**J. Ritchlin:** You trust us.

**J. Yap:** That's what they said too.

**C. Orr:** I have made it very clear that the evidence we presented on escapements needs to be verified. It needs to be verified independently. We've asked the government agencies to do that. We've asked the Pacific Salmon Forum to do that. We haven't had any response on that yet. So that's the first step.

Are those declines real? Are they traceable to the start of fish farms? Alex Morton might say there are possibly some disease issues intertwined as well — disease outbreaks. She had some excellent evidence of that at the salmon aquaculture dialogue.

I think that, again, you need to look Europe. You need to look in particular at some of the experiments that Dr. Patty Gargan has done in Ireland, where they had a tremendous decline in sea trout populations with the advent of salmon farming.

You can only go so far with correlations — okay? We admit this, and scientists will admit this. What you try to do is go towards experimental evidence to try and prove whether there's a cause and effect. Patty Gargan did that, and he's talked about these experiments here.

Patty will be coming for another workshop in January, so he's going to, hopefully, talk about that again.

What he said was: "Okay, it looks like there's something happening here, but we have to be careful, and we have to prove that it happens."

So he got the Irish authorities to actually follow some of those farms along one coast of Ireland, and what he found was that the sea trout rebounded. They rebuilt once the farms were taken out of the equation, and that is still some of the best evidence — along with this meta-analysis I've just told you about, by Jennifer Ford — that there are population-level impacts.

We have to look to the Europeans for their broader experience on this. Again, some of the people like Peter Heuch, who examined the Norwegian action plan, showed that with all their control efforts on sea lice, they still have not been able to recover these wild populations of fish.

At the recent ICES workshop in Bergen last October, there was a lot of talk about the impacts of sea lice in these fjord-like systems. I've talked to several people who were at that workshop, and they did say their belief was that if you had one salmon farm in these long fjord-like systems, that was enough to make it so that you could not recover the wild populations in that particular fjord.

This is the evidence that we have. It's not rock-solid. There's no question about that. We have better evidence on individual impacts, and there have been a couple of papers done just recently. Again, they're very convincing and persuasive in terms of the impacts on individual fish. We tend to project what happens on the individual fish to the population level.

I guess the whole thing is: how much evidence do we really need before we're going to do something about this?

[1540]

**J. Yap:** Brian Riddell talked about the nine steps that go into establishing causation. I understand that is an accepted standard and the difference between causation versus correlation. You mentioned correlation as being one aspect and causation another. Two events happen at the same time. Does one cause the other? I wonder if you could share with us your thoughts on the criteria — the nine-step criteria that I understand are in place.

**C. Orr:** Obviously, he's got me there. I don't know the nine steps, but I do know that, as I said, you try to follow up correlational studies with experiments and ways of offering more definitive proof. But you have to look at this situation on a global context too, which is what we've done.

One of the things that Patty Gargan told us when he came over here just recently is: "You're 15 years behind where we are in Ireland. What we did was spend the first five years denying that there was even a problem in the crashes of the sea trout populations. We spent the next five years looking for every reason under the sun, except the salmon farms."

In fact, they even looked at whether Chernobyl had caused the crash of the sea trout populations in Ireland. He said: "Finally, in the last five years we've actually started dealing with the problem."

I submit to you that we can talk about the nine steps, but we can also talk about what the global evidence suggests, what the Europeans are saying. They're saying very definitively that sea lice from salmon farms are a huge problem that cause population declines in fish and: "Canadians, you should learn from our example instead of using uncertainty to maintain the status quo." That's exactly what is happening with both levels of government in terms of the sea lice debate. You're hearing it again and again.

I will also point out that I have a lot of respect for Dr. Riddell. What he did say to the *Vancouver Sun* at one point was that it was pretty apparent where these sea lice were coming from, and it was from the farms. He was made to retract that statement by the communications branch.

**J. Yap:** Okay. That didn't come up in the discussion.

I'd like to turn to the presentation on the Rees study. I can't remember who did that.

**D. Lane:** Gerry. He'll be back in just one sec.

**J. Yap:** While we're waiting for him to come back... It's unfortunate that Chief Mountain has left, but I wonder if any of the panel might know the answer to this. With regard to the contamination in the traditional territories of the chief and some clam beaches that now are contaminated, are you aware of any research that's been done that can rule out any other cause for the contamination other than the location of the salmon farms?

**D. Lane:** Well, the one thing that needs to be stated is that they had intended on doing a very specific study methodology that would have looked at the farms and the contamination. To do that, they needed feed samples. They needed cooperation from the salmon farms in the vicinity, and that was denied.

A pretty clear answer could have been arrived at. If they had a tracer, they could have said: where did that contamination come from? So a golden opportunity was lost because of that lack of cooperation.

**J. Yap:** So there was no study or research done, and that might have been one of the reasons that you couldn't come to agreement on the information.

**C. Orr:** Can I just add to that? As I alluded to at the beginning of this session, there was a paper published last year on mercury — where I was a co-author and Robert was a co-author — in *Environmental Science and Technology*. There was absolutely no doubt it came from the fish feed.

The mechanism is easily explained. What happens is the elemental mercury that is ground up in the fish, into the feed, is excreted by the fish. It goes to the bottom under the fish farms. It's transformed by anaerobic bacteria into an organometallic form that is bioaccumulated. We know that it came from the fish feed and from the fish farms because the elevation in the rock-fish was only found around the fish farms. So when

control studies were done, that is where rockfish were taken. In areas where there were no salmon farms, there were no concentrations of mercury in the rockfish. It was only around the salmon farms.

The method of mercury uptake is well known in the scientific literature, and this study is in *Environmental Science and Technology*. It's the first one to show ecosystemic effects from salmon farms.

[1545]

**J. Yap:** I think this question might have been asked, but I just want to be clear. Are there other instances of contamination of clam beaches in areas where there are fish farms? Are you aware of any similar situations?

**C. Orr:** In general, it's not as specific a study as that. The study that just came out last week from Europe talks about the marl, the kind of other benthos under these salmon farms and the reduced biodiversity. Generally, the studies that have come out — they're few and far between, by the way — have shown that there is a benthic impact in general, and they haven't really gone to the degree of looking at clam beds. They're mostly looking at the sea floor under these farms and in nearby areas.

**J. Yap:** Gerry is back, so I'll ask a question on the Rees study on ecological footprint. You talked about the ecological footprint of farmed salmon. I haven't read the paper in detail, but I couldn't find it in scanning it. Did Dr. Rees look at the ecological footprint of other sources of protein, like pigs or cattle?

**G. Thorne:** I don't have the paper in front of me, but I recollect that in there he does contrast it to other factory farming of chickens and pigs and things.

**J. Yap:** So how does farmed salmon compare to the others?

**G. Thorne:** As I recollect, it's basically equivalent to a large factory farming operation in terms of its footprint.

**J. Yap:** So it's not higher than or lower than?

**G. Thorne:** I think it's pretty much the same as a factory farm for pigs, for example.

**C. Stewart:** The difference being, of course, that the footprint is not contained. Because it's in an open aquatic environment, the impacts of that footprint can't be contained in the same way that a land-based....

**G. Thorne:** And the issues related to feed and energy dissipation, I think he was arguing, were similar.

**R. Austin (Chair):** I think that's generated another question from Gregor.

**G. Robertson:** Actually, my question is more related to the issue of fish-farm-free zones. We talked about it briefly — and not wanting to designate high-

impact zones and sections of the coast that maybe are excluded from salmon farms.

But just to be clear on what CAAR's position is. We had input on this from the Salmon Farmers Association this morning. We've had lots of input on Norway's model of designated fjords and rivers. Can you clarify your position in terms of some of the coast not being available for salmon farming?

**J. Ritchlin:** I'll take part of this. I think others will speak to it. It's very important to remember that there is a major effort going on where the federal and provincial governments, coastal first nations, the conservation groups and other users are trying to get a system of ecosystem-based planning and marine use planning in place on the entire coast.

If nothing else, that should go on in concert and in an integrated fashion, and fish farms shouldn't be singled out and given yes or no zones before we do some of the basic research about where our critical species spawn, where they rear their young and what the habitat is that is mandatory for maintaining the biological diversity on this coast.

That's only a partial answer, and it's not specific to our policy on farm-free zones, but I think, in the larger context, the province of British Columbia has been an impediment to the progress of that planning process that's mandated under Canada's Oceans Act. That process, and the underlying baseline research that's necessary to make it successful, is required in and of itself — independent of whether or not there are farm-free fjords, as lovely as that is to say.

**C. Orr:** I'd just like to add one thing to this. There is a bit of a misconception that setting aside these areas in Norway was some kind of marvellous little bit of foresight. Well, that's not really the case. The case was that they had 800 farms operating on the coast of Norway. They've seen a precipitous crash in wild Atlantic salmon. There's now 100 times more farmed salmon along the coast of Norway compared to wild salmon. There are only two million wild Atlantic salmon left, and there are 230 million farmed salmon.

This wasn't some marvellous planning exercise. It was a desperation move to try and preserve some of the last little bits of wild Atlantic salmon that existed in Norway. It goes away from foresight to desperation, so we should keep that in mind as well.

[1550]

**C. Stewart:** Just one further comment to that. I think it would be fair to say that CAAR's position is that open-net-cage aquaculture, as it is currently practised, is destructive and needs to change — needs to transition into more sustainable technology such as closed containment. So from our perspective, it would not be appropriate to zone any area of the B.C. coast as an area appropriate for further development of open-net-cage.

We're seeing the impacts on the benthos. We're seeing the impacts on wild stocks. We're only beginning to research the impacts on rockfish, clams and

other species. We believe that a transition would be the only appropriate measure and that zoning write-off zones on our coast would be wholly inappropriate.

**G. Thorne:** We could zone them all into English Bay and see how that worked.

**D. Lane:** We have a different geographic issue here as well. If you take, just for one example, a farm that was almost about to be approved at Cutter Point.... This is in Johnstone Strait. The location of it is such that every single juvenile salmon from Jervis Inlet, Bute Inlet, Howe Sound — the entire Fraser River system, which is probably about 1.5 billion smolts — has to go through one place, going up through Johnstone Strait. That's astounding. Those kinds of problems don't exist in Norway.

There were going to be two farms situated there — two new farms. That problem was not even part of the siting criteria.

**C. Stewart:** When the CEAA process undertakes a review of the appropriateness of siting a farm somewhere, it's only site-specific. It can't look at anything, any impacts, outside the footprint of the farm. So impacts on the Fraser River, on the Adams River, on stocks on the rest of the B.C. coast are irrelevant from the CEAA perspective — entirely relevant to the future of the province, but irrelevant from the CEAA perspective.

**G. Robertson:** Is there anything related to CEAA or any of the environmental assessments that takes into account migratory routes or the broader interest?

**D. Lane:** No, there is not.

**C. Stewart:** Only immediate adjacency under the regulations. I think you have to be one kilometre from a known salmon migratory spawning stream. That's it.

**C. Orr:** You can bet that they don't account for sea lice in the CEAA review.

**C. Stewart:** Just a further comment on the communications around sea lice. It's my understanding — and I'd have to look up the reference documents at the office — that DFO contracted out to a communications firm a number of focus group studies on how best to communicate the issue of sea lice and what the public attitudes are towards this. There was quite a comprehensive report from that contracted agency back to the Department of Fisheries communications department around how best to spin the issue. That might be something the committee would be interested in reading.

**R. Austin (Chair):** Seeing no further questions from members, I'd like to thank all of you for coming here and making your presentations today. It was very useful.

Now I would like a motion to adjourn these hearings.

The committee adjourned at 3:54 p.m.



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