



## Sustainable Salmon Farming Riding the Crest



Nell Halse, President

International Salmon Farmers Association

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ISFA has not been around for as long as AquaNor but we have been in existence for 21 years.

The organization has changed as the industry has changed and has explored various models and mandates.

A few years ago, we decided to focus our efforts on communications and networking. We don't have an office or paid staff so have limited resources.

But we provide a valuable service to the industry as a communications network and an annual meeting place and we hope to take a more active role in events like this in the future.

We also serve as an important vehicle for dialogue outside the industry. For the past ten years, ISFA has been part of a Liaison Group with NASCO (North Atlantic Salmon Conservation Organization) which has as its guiding principle the promotion of both wild salmon conservation and a responsible salmon farming industry.

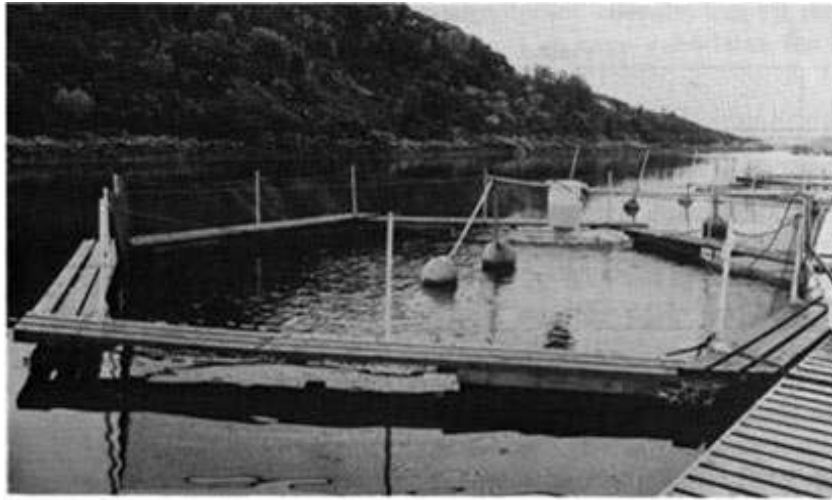
Many of our members participate in the WWF Salmon Aquaculture Dialogue.

And we agreed at a meeting just yesterday that we would work on sharing key information and research on sea lice.



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Source: SINTEF Fisheries and Aquaculture

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Salmon farming has been around for more than 30 years. And since we are celebrating that milestone here this week I thought I would begin by taking you on a short visual time travel expedition. Here is an example of one of the first cage systems in Norway.



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Source: New Brunswick Salmon Growers Association

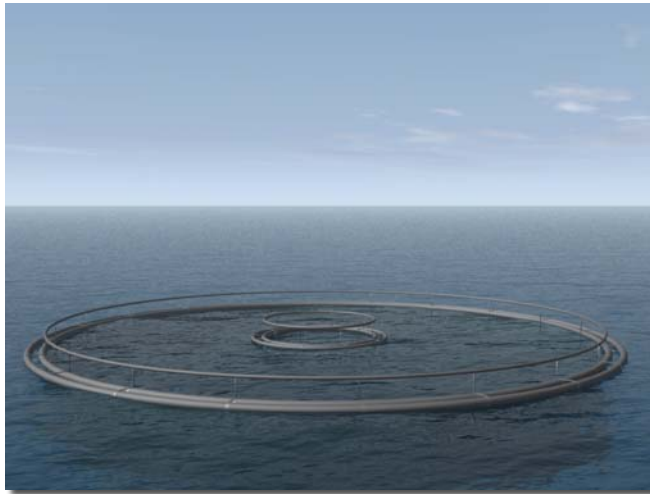
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These are photos from eastern Canada - from more than 20 years ago.



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Bigger units  
from  
40 to 157 m  
circumference

Source: Aqualine

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And here we are today with a model of a much bigger and much different cage - a long way from the wooden cages and hand feeding systems of the early days.



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Approximately 100  
times more volume

### 1985

40 m x 4 m depth =  
550 m<sup>3</sup>  
6 persons  
180 tons

### Today:

157m x 30m depth =  
60,000 m<sup>3</sup>  
2 persons  
1100 tons

Source: Aqualine

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Another view of a modern system which offers approximately 100 times more volume.



We could spend a lot of time exploring the past and looking to the farm of the future. If we consider the innovation that has characterized this industry in the past 30-40 years, we can expect to see many more changes in the years to come. We can also be confident that the face of the industry will change as we venture into more challenging environments.

But one thing will not change. The focus on environmental performance and sustainability will always be with us. In fact, we can be sure that the scrutiny on our industry will increase, as will the demands for us to demonstrate environmental responsibility.

ISFA members are confident that the same innovative and entrepreneurial spirit that built the industry will also solve the issues that face us today - issues like: feed that is sustainably sourced, storm proof and error proof containment systems, better vaccines and preventative health measures and a more eco-system based approach to farming the seas.



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## Sustainable Salmon Farming Riding the Crest



### Country examples:

- Norway, Canada, US, Ireland, Scotland, Tasmania\*

### Company examples:

- Marine Harvest
- Cermaq
- Cooke Aquaculture

*\*Chile will be focus of separate presentation*

So, what is sustainable salmon farming?

Sustainability is about better technology and equipment

It's about doing things right

Acknowledging and addressing concerns

Working for the long-term

Protecting livelihoods & communities

Protecting the environment

It is about protecting the future: economic, social and environmental

Rather than debate definition of sustainability, I thought I'd give you a few examples from our member countries and also from three international companies. These are just a few company examples - to give you an idea of where salmon farming has come and where it is going as a sustainable industry.

I would like to acknowledge and thank the country and company representatives who have provided me with information for these slides.

Not surprisingly there are common themes but there also some unique examples of leadership and achievement.



I'd like to begin with the world's biggest salmon producer, Marine Harvest, with 1/5th of global production and operations in more than 70 countries

Marine Harvest has set an excellent example for the industry with this Sustainability report. I encourage you to find it online and read every page. Other companies will use it as a model for their own efforts on sustainability and future reports.

It begins with a commitment to sustainability, transparency and open dialogue by the CEO. It recognizes areas that need improvement and tells us how the company plans to do so.

It includes reports on

- partnerships and initiatives with eNGOs, local communities and First Nations
- its global quality program
- Results of food safety and testing regimes
- Adherence to various certification schemes
- Fish welfare, health management practices and treatment records
- Environmental management practices and reports on escapes
- Chemical and energy use reports
- Reports on sourcing of feed ingredients
- Conservation projects like the multi party effort to restore wild salmon runs on the river Vosso



**The Cermaq Group** established sustainability principles and a set of indicators based on GRI (Global Reporting Initiative), and will report according to GRI next year.

Feed:

Established **EWOS Innovation R&D center in Chile** to meet the unique requirement there. Focus on development of new functional feeds for the control and prevention of fish diseases  
 Working to improve the sustainability of fish feeds by reducing the levels of marine protein and oil in EWOS diets

**EWOS Norway** opened a new feed plant in Florø which has a production capacity of 250,000 tonnes per year and is the most modern fish feed factory in the world.

Moved all Atlantic salmon smolt production in **Chile** to land based facilities (closed containments)

Engaged in CAMP (coordinated area management plan) in the **Broughton, BC**

Defined a First Nation policy for Mainstream **Canada** early 2009

The **Cermaq Groups** is working towards OHSAS (Health & Safety) certifications for all operations for 2010.



Cooke is based on the east coast of Canada but has operations in every Atlantic province, the State of Maine and in southern Chile. **Family owned** company with deep community roots. This has led to a strong **focus on community** relations and environmental, social and economic sustainability.

The company is fully integrated with **management over the entire value chain** - from egg to plate. This includes all aspects of production, feed, equipment manufacturing, sales and distribution. Major investments in R&D, especially in Integrated Multi-trophic aquaculture (**IMTA**) - an eco-system based approach to farming.

Cooke and all east coast farmers must follow a 3- Bay Management system which ensures single year class bays, crop rotation, fallowing as well as strict bio-security protocols.

Active in a number of international initiatives like the WWF SAD but recently made the decision to pursue 3rd party certification and the **Seafood Trust Eco-label** under the **Global Trust Certified Quality Salmon Program**. 5 areas:

1. Maintain a pristine quality marine environment
2. Use feed made from sustainable sources
3. Reduce energy usage and energy-related carbon dioxide emissions
4. Reduce water use
5. Reduce packaging and eliminate waste where feasible

Internal auditing system / setting goals / continuous improvement / measuring performance / external audits

Committed to working with communities / working waterfront partners / eNGOs to improve communication, information sharing and collaboration



## Sustainable Salmon Farming CANADA



### Canadian Sustainability Initiatives

- Industry Attains Certification: Cooke, Admiral
- Formation of Canadian Aquaculture Standards Forum
- Knowledge Exchange: Standards / Certification Workshops
- Industry Readiness: Salmon & Mussels Benchmarking
- GRI Training & Sustainability Reporting
- Working with government to implement a National Aquatic Animal Health Plan (NAAHP)



Here are some highlights from the Canadian industry:

Industry attains **Certification** – 2 salmon farming companies on the east coast have already attained certification (Cooke – Seafood Trust eco-label; Admiral Fish Farms –SQF)

CAIA has initiated the **Canadian Aquaculture Standards Forum**. This is a transparent industry/government partnership to address key certification issues - help build capacity within industry and provide industry with options related to Standards and Certification

CASF organized a workshop last February - Speakers from retail, foodservice and certification bodies provided an excellent venue for information exchange and debate.

CASF is moving forward with **benchmarking** those sectors of the industry that are not yet certified but are interested to assess their readiness for certification through mock audits. BC Salmon industry was completed last year – this year the mussel industry is being benchmarked. Results will provide guidance for improvement and decision making.

CASF is also assisting industry with **GRI Training (Global Reporting Initiative)** - this training will Provide industry with an internationally accepted framework for reporting on sustainability.

A **National Aquatic Animal Health Program** is currently under development in Canada. The NAAHP will Provide a national framework for the prevention & management of aquatic animal disease.



## Sustainable Salmon Farming CANADA




### Sustainability Initiatives with Department of Fisheries & Oceans

- Support for CASF & industry projects
- Development of Organic Standards
- Sustainability Reporting Initiative
- Standards Influencing (ISO, FAO etc.)
- US Outreach Events (together with CAIA, engagement in US markets)



DFO provides financial and management support for CASF and CASF projects and is leading on the development of **organic standards** in Canada. It will be consistent with standards in other jurisdictions such as the US and the EU. A Working Group of industry participants and others with knowledge of organic aquaculture has been formed and a consultant engaged to develop the standard.

### **Sustainability Reporting Initiative**

Based on the Global Reporting Initiative model, DFO will be producing an annual sustainability report on the Canadian aquaculture industry – the report will target influential decision makers (e.g. Retailers). The SRI is NOT a report card but will be used to chart change.

### **Standards Influencing**

DFO is involved in a number of initiatives such as ISO and FAO to provide Canadian perspectives and Canadian content on global standards development.

### **US Outreach Events**

Together with CAIA, DFO is actively involved in US outreach meetings – these meetings are organized with the assistance of Trade Commissioners but targeted to buyers and ENGO's. Clear messages from government leaders are presented on the sustainability of Canadian seafood & related issues.

Industry is also working with **provincial governments** to improve environmental monitoring and fish health programs and partnerships on R&D



## Sustainable Salmon Farming IRELAND



- Pioneered OFFSHORE salmon farming and organic production in early 1990s;
- Introduced "SINGLE BAY MANAGEMENT" in the early 90s for multi user bays to improve husbandry and prevent sea lice infestation;
- Over 80% of national production is certified as ORGANIC production
- NATIONAL PEST MANAGEMENT PLAN in force since 2008;
- Local sourcing of Fish meal and fish oil
- High success rate in preventing escapes
- Lead development of EU's policy on Sustainable Aquaculture

The Irish salmon farming industry is relatively small but they have some good examples of sustainability to offer.

Today - over 80% of national production is certified as organic production - **meaning lower stocking densities, organic feed and reduced use of medicines;**

A National Pest Management Plan has been in force since 2008 - **Government backed plan with the emphasis on prevention;**

Fish meal and fish oil used in Irish produced feed is **sourced from the local pelagic fleet and the local primary fish processing industry;**  
**Very low reliance on imported inputs, making economic as well as environmentally sustainable sense;**

High success rate in preventing escapes: **no significant escape incident in over 5 years - escapees are monitored in the annual wild salmon monitoring programme for over 15 years and have never amounted to more than 1% of the total salmon population.**

Ireland was to the forefront in promoting the EU's new policy on Sustainable Aquaculture which took two years to produce:

[http://ec.europa.eu/fisheries/cfp/aquaculture\\_processing/aquaculture\\_en.htm](http://ec.europa.eu/fisheries/cfp/aquaculture_processing/aquaculture_en.htm)

<<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0162:FIN:EN:PDF>

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## Sustainable Salmon Farming MAINE, USA

17 state and federal regulatory authorities

- Permits, licenses, leases conditional on monitoring and auditing performance
- Linked to environmental and production monitoring programs
- Linked fish health surveillance, certification and bio-security auditing program
- Integrated pest management and auditing program



Another small but relatively important industry, the US industry in Maine, must comply with 17 state and federal regulatory authorities

**Environmental monitoring program** consists of two diver transect surveys under each cage array every year, regular and frequent benthic and fauna monitoring. Therapeutant residue testing in sediments and flora and fauna. This is then linked to reporting of both biomass and feeding levels so both inputs and outputs are monitored against established thresholds. If those thresholds are violated you will get a warning. If violations continue your permits and leases can be pulled.

**Routine and frequent fish health surveillance** is conducted on all sites. Facilities are then certified as to their health status. Each facility must be clean for three consecutive years in order to maintain its certification status.

**External auditors** audit 160 different factors on every farm every year. Results are reported to the state and the farmer.

**Integrated pest management program** includes surveillance, year class separation, site fallowing and rotation.



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## Sustainable Salmon Farming MAINE, USA

- Containment management system and auditing program / Cooperative MOU with 3 national environmental groups / DNA marking and traceability
- Bay Management / fallowing / crop rotation - coordinated with eastern Canada
- Comprehensive Code of Practice



The HACCP and risk based **Containment Management System** is designed to eliminate escapes. External third party audited and reported to State, federal environmental groups and farmers.

**Trout Unlimited, Atlantic Salmon Federation and Conservation Law Foundation** were critical to development of containment management system.

Bay Management and legal agreements to collectively manage all farms in same watershed to a minimum set of standards and to coordinate management actions.

**Code of Practice** covers all areas of production, environmental and social impacts. Based on the UN code of responsible fishing and aquaculture. Harmonized with the UN Guiding principles.



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## Sustainable Salmon Farming NORWAY

- New strategy for sustainable aquaculture launched by the Ministry
  - Industry fully engaged in implementation

FHL has set the following environmental policy:

**“Production of seafood products shall be environmentally sustainable and environmental pollution shall not limit the possibility of producing safe seafood.”**



New strategy for sustainable aquaculture launched by the Ministry, industry engaged in implementation <http://www.fhl.no/miljoe/oppdrettere-positive-til-strategi-for-baerekraftig-vekst-article3308-24.html>

FHL has set the following environmental policy: **“Production of seafood products shall be environmental sustainable and environmental pollutions shall not reduce the possibilities of producing safe seafood.”**

Here are some examples of how Norway is implementing this policy:

- In the last 10 years we have had a reduction in the number of sites used for fish farming activities, a trend that continued also last year. The production of aqua products have increased in the same period. **We have fewer, but bigger sites.** A further growth in seafood production does therefore not imply increased use of sea area.
- **We are increasing the use of biproducts from fish farming activities.** More than 30% of biproducts in the seafood industry comes from farmed fish. In the salmon farming sector itself, the amount of bi-products is nearly 100%. There is virtually no waste - all parts of the salmon are used.
- **Reliance on Fish meal and fish oil has decreased.** Many of the world's leading feed companies are based in Norway and are investing in major research into alternate ingredients.



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## Sustainable Salmon Farming NORWAY

- Managing environmental impact
- Successful reduction of escapees: Vision of '0'
- Control and reduction of sea lice is a priority



**We have reduced discharges of nutrients from fish farming, mainly nitrogen and phosphorus so that they have a minimal and localized effect.** A study has shown that the manmade discharges in Norway – including aquaculture activities – represent 2% of the nutrients along the coast from southern Norway to Mid-Norway. Very rich Gulf Stream provides natural nutrients.

**The Norwegian Aquaculture industry has a clearly stated zero-vision when it comes to escapees.** The operational goal is to reach a level where escapees do NOT affect the wild-salmon stocks in a negative respect.

- In 2008 only 0.04 per cent salmon escaped (totaling 100 000 salmon), the lowest % figure and absolute figure ever, despite increasing volumes. This is due to strong engagement in the industry especially related to awareness and training, but also technical development, see <http://www.fhl.no/miljoe/0-4-promille-laks-paa-roemmen-article3277-24.html>

**Control and reduction of salmon lice is a prioritised activity.**

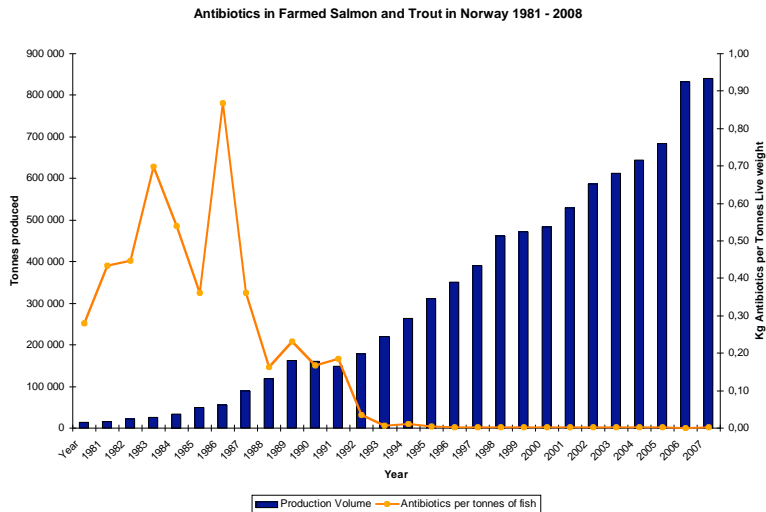
*"Lice from aquaculture installations shall be reduced to such a level that it will not in any way be damaging for wild salmonid populations "* (National action plan against sea lice)

- Through coordinated sea lice treatments, good results have been achieved. However, we are investing in further research and exploring new methods for even better sea lice control. At our ISFA meeting yesterday, member countries made a commitment to share information on the available science as well as management techniques and husbandry practices. We also made the commitment to coordinate further research. It is clear that sea lice management is a major focus for salmon producing countries.



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## Sustainable Salmon Farming NORWAY



Source: Marine Harvest, Statistics for whole Norwegian industry

Dramatic reduction in use of **antibiotics** (see chart). This is a worldwide trend. Even in cases where farmers have had to lobby for more treatments, the overall usage is down.

Several aquaculture companies are engaged in the **Vosso-salmon project**, to ensure the survival of the local Vosso salmon. A new hatchery for the Vosso salmon has been built and will use synergies from the competence from farming and research with local knowledge.

This engagement and leadership in conservation projects is found in many other countries as well (Canada and the US)



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## Sustainable Salmon Farming SCOTLAND



- Feed substitution
- Fish health management – Scotland pioneered synchronised marine production in loch and voe systems
- Emphasis on voluntary regulation: Code of Good Practice / stakeholder consultation



**Feed substitution** – Scotland has been researching and developing terrestrial plant protein and oils to replace fish meal and fish oils in the feed diet for the last 30 years

**Fish health management** – Scotland pioneered synchronised marine production in loch and voe systems: (Tri-partite Working Group / Area Management Agreements)

### **Emphasis on voluntary regulation**

Independently audited Code of Good Practice for Finfish Aquaculture (CoGP) introduced in March 2006

Wide range of interested stakeholder groups consulted

Legislation by government is 'light touch' and is a backstop to the CoGP

During the last three years there has been both a downward trend of escape incidents and the **lowest number of escapes recorded (2008 was down by 62% from previous year)**



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## Sustainable Salmon Farming SCOTLAND

- Social sustainability
- Economic sustainability – injected in excess of £500m into UK economy in 2008

(Source: Scottish Salmon Producers' Organisation (SSPO) member survey, 2009)



### **The SSPO has also identified social and economic sustainability milestones:**

**Social sustainability** – industry sustaining long-term jobs in fragile, rural communities

1,500 direct jobs with a further 4,700 downstream

70% of employees live within 10 miles of place of work, 88% live within 20 miles

Average employee length of stay is 8 years (compares to UK average of 5.6 years)

In one remote, rural location the average length of employment was 23 years

**Economic sustainability** – injected in excess of £500m into UK economy in 2008

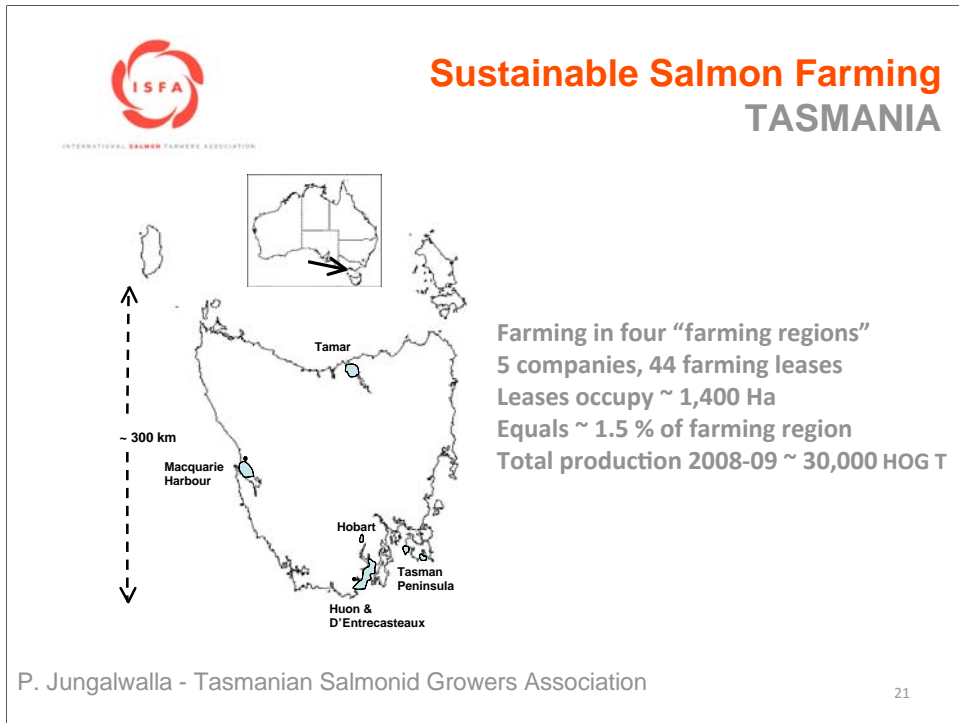
Inclusive of expenditure on suppliers and services which topped £304m in 2008

Many rural businesses are reliant on a successful, sustainable and profitable salmon sector

Direct wage payments translate to an injection of £165m into rural economies as money earned locally is spent locally

Investor confidence has returned with an additional £84m reinvested over the last three years in further development of the industry

(Source: Scottish Salmon Producers' Organisation (SSPO) member survey, 2009)

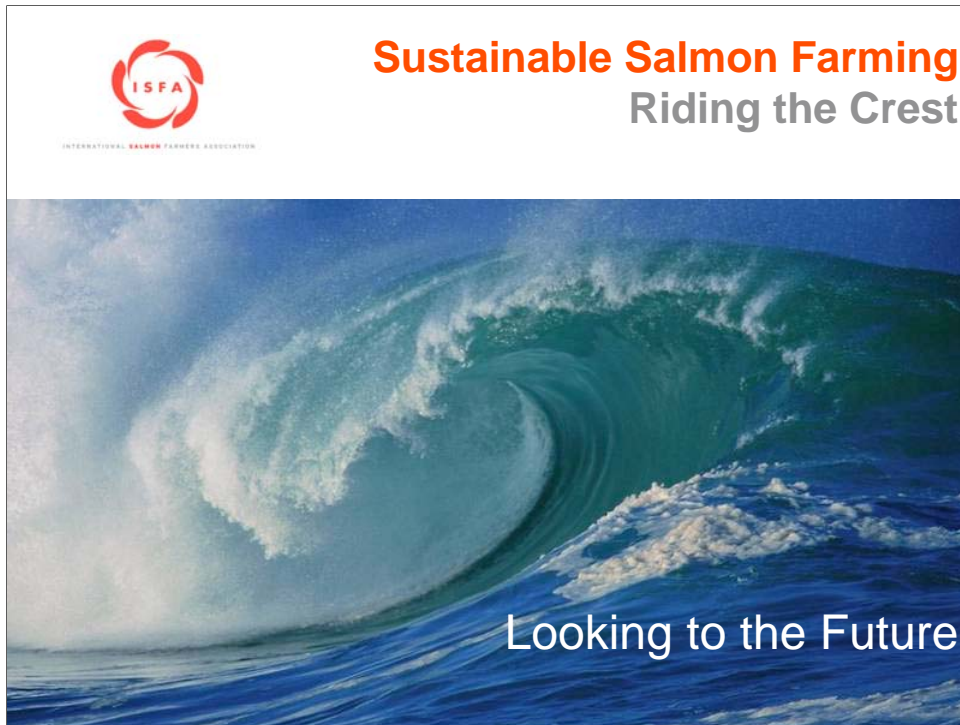


And last, but not least, we travel to the far south to the country of Tasmania.

Between 2004 and 2008 the Tasmanian salmonid farming industry directed a significant portion of its voluntary R&D levy, together with geared funding from national and state governments, to a major project within the Aquafin CRC which **developed sophisticated 3-dimensional hydrodynamic and biogeochemical models of the Huon and D'Entrecasteaux farming region (where two thirds of the Tasmanian industry is located) which were calibrated and validated with extensive environmental data.**

This project, undertaken by CSIRO and TAFI, generated considerable knowledge of actual and possible environmental effects of salmonid aquaculture at an ecosystem level, and led to the **development of monitoring and modelling tools which can be applied to both adaptive management strategies as well as scenario assisted planning for future development.**

An outcome of this research has been **the development and implementation of a broadscale environmental monitoring program, covering the whole Huon and D'Entrecasteaux farming region rather than just farming leases, monitoring both benthic and water column parameters. This annual monitoring program has been entirely funded by Industry, not only to ensure the health of our stock, but also to monitor and demonstrate our credentials in environmental sustainability.**



**So, as you can see there are many themes when we look around the world for examples of sustainable salmon farming: Bay or area management, fish health science, expertise, better feeding systems, feed ingredients that are sustainably sourced. Focus on environmental management and a more recent trend on certification, reporting and transparency.**

**We are seeing more cooperation between countries and jurisdictions with MOUs and commitments to share science, technology, regulatory expertise and efforts to promote sustainability, third party certification and education.**

**Collaborations with international conservation organizations and NGOs like:**

**WWF Salmon Aquaculture Dialogue**

**NASCO Liaison Group**

**Individual efforts to engage with our detractors and groups like the Monterey Bay Aquarium**

-increase awareness of industry standards and achievements

-Goal is to not only gain acceptance in the marketplace for our wonderful products but to achieve recognition in the community at large as a Sustainable Salmon Farming industry so that we are on everyone's GREEN list.

-THANK YOU