

CANADIAN NET-PEN AQUACULTURE: FUNDAMENTALLY UNSUSTAINABLE



CANADIAN NET-PEN AQUACULTURE: FUNDAMENTALLY UNSUSTAINABLE

March 2010

CONTENTS

EXECUTIVE SUMMARY	4
SEAFOOD MARKETS DEMAND REAL SOLUTIONS.....	5
CANADA'S CRISIS OF MISMANAGEMENT	5
CONFLICTING MANAGEMENT MANDATES	6
DENYING PUBLISHED SCIENCE.....	6
WEAK REGULATION	6
SLIDING BACKWARDS ON SUSTAINABILITY	7
ORGANIC LABEL FOR NET-PEN SALMON	7
GREAT LAKES TROUT AQUACULTURE FROM CONTAINMENT TO NETS.....	7
ADDING MORE SPECIES AROUND NET-PENS: HOW MUCH OF A SOLUTION IS IT?.....	8
SEA LICE EPIDEMICS AND CHEMICAL WARFARE	8
REAL SOLUTIONS THROUGH INNOVATION	9
BENEFITS OF CLOSED CONTAINMENT.....	9

APPENDIX 1

STATEMENT FROM THE GEORGIAN BAY ASSOCIATION



CAAR Member Groups:



Healthy Oceans. Healthy Communities.



David Suzuki Foundation

SOLUTIONS ARE IN OUR NATURE



Georgia Strait Alliance
Caring for our coastal waters



Working out for BC's Wild Salmon



Coastal Alliance for
Aquaculture Reform

Suite 1405 - 207 West Hastings Street
Vancouver, BC V6B 1H7 Canada
604-696-5044

www.farmedanddangerous.org

EXECUTIVE SUMMARY

Around the world, net-pen salmon farming has caused substantial harm to ocean ecosystems. Mass escapes, disease outbreaks, and sea lice infestations lethal to wild salmon make headlines in scientific journals and popular media alike. Net-pens allow industrial-scale livestock operations to be placed directly in the ocean, but prevent any real separation between the farm and the wild environment that surrounds them. Fish feces, waste feed, disease and parasites all pass through the nets and into the marine environment; and the farms are vulnerable to pathogens in the wild, algae blooms, fluctuating water temperatures, and massive escape events.

The salmon farming industry, the vast majority of which depends on net-pens for production, is now adding another challenge to its viability—growing marketplace support for sustainability. Leaders in the foodservice and retail sectors are sending a clear message to their seafood suppliers: move to sustainable production. Products like net-pen farmed salmon that are linked to severe environmental problems are not worth the risk to company brands and reputational capital.

The Canadian government has invested significant funds to promote the salmon farming industry. The Department of Fisheries and Oceans Canada (known by the acronym DFO) is the lead federal government agency mandated by the Canadian constitution to ensure healthy aquatic ecosystems and to conserve and protect wild fish and fish habitat. DFO has been given a second, political mandate to promote aquaculture and the aquaculture industry. These two mandates are in fundamental conflict and have resulted in consistent failure to protect wild aquatic resources from net-pen aquaculture impacts. Published, peer-reviewed research on the impacts of net-pen aquaculture on ecosystems is debated and dismissed by DFO while scientists, businesses and management regions around the world increase their acceptance of the scientific weight of evidence and are taking steps to address these same impacts.

Basic requirements for sound management, such as science-based regulations, are largely absent for Canadian net-pen aquaculture. Useful monitoring data collected by the industry is not available to the public or independent scientists, and there is no current mechanism to ensure data reported to the government is accurate. If a regulation is broken, penalties are low, if enforced at all.

While government and industry efforts are focused on expanding an inherently vulnerable and unsustainable way of farming fish, a better model for salmon aquaculture already exists. Closed containment systems, whether sited on land or water, can effectively address the primary environmental impacts of net-pens. When coupled with advances in feed that reduce the dependence on wild-caught fish for meal and oil, a truly sustainable model for aquaculture can be achieved. It is within our grasp to protect wild salmon, marine ecosystems, and find long-term solutions to the environmental impacts of aquaculture. By adopting closed containment, industry and retailers can begin meeting the growing demand for sustainable seafood. To achieve this, government and industry must change the focus of their research and investment in aquaculture towards the full implementation of closed containment technology.

SEAFOOD MARKETS DEMAND REAL SOLUTIONS

The collapse of the Chilean salmon farming industry due to a massive disease outbreak demonstrated that poor management of technology with inherent vulnerabilities is not just an environmental or social problem; it is a problem for buyers. The removal of millions of farmed salmon from the supply line was accompanied by a story in the New York Times that implicated American retail heavyweights such as Costco in the sale of Chilean farmed salmon.¹ The details of antibiotic abuse and rampant disease connected the disaster of net-pen salmon farming with farmed salmon filets found on supermarket shelves across North America.

In Canada, net-pen salmon farming is becoming synonymous with sea lice infestations that kill vulnerable young wild salmon as well as the degradation of coastal ecosystems. Mass escapes, disease, and sea lice make headlines in scientific journals and popular media alike.

If part of your business is seafood, you need to be aware that the impacts from the salmon farming industry are running counter to the trajectory of consumer interest. Polling shows 89% of American consumers are interested in eco-friendly products.² We've already seen a steady growth of organic food sales.³ Canadian consumers have indicated they consider sustainability in their purchasing decisions right after the "givens" of price and quality.⁴

Net-pens, the technology used by the vast majority of the salmon farming industry, cannot meet sustainability expectations. Net-pens allow industrial-scale livestock operations to be placed directly in the ocean, preventing any real separation between the farm and the wild environment that surrounds them. Fish feces, waste feed, disease and parasites all pass through the nets and into the marine environment, and the farms are vulnerable to pathogens in the wild, algae blooms, fluctuating water temperatures, and massive escape events caused by marine mammals or storms.

The vulnerability of the net-pen salmon farming industry was exemplified by a massive disease outbreak and staggering production losses in Chile last year. This year, Norway, the industry leader globally, is suffering from record breaking sea lice levels with infection rates six to ten times above management targets.⁵ Ballooning infection rates can be the result of the development of resistance by sea lice to chemical treatments.^{ibid.} Chemical resistance has been reported in Chile, Scotland and Canada as well.

1 http://www.nytimes.com/2008/03/27/world/americas/27salmon.html?_r=1&scp=7&sq=chilean%20farmed%20salmon&st=cse

2 Information Resources, Inc. 2007

3 US Organic Trade Association, 2007

4 Poll conducted by Angus McAllister

5 <http://www.vg.no/nyheter/utskriftsvennlig/?artId=588564>

LEADERS IN ACTION

Target Corporation, the second largest discount retailer in the United States, made news in early 2010 when they announced their plan to remove all open net-pen farmed salmon from their product lines and store shelves,⁶ following the same decision made by Compass Group Canada the year before.⁷ These companies are not alone in this bold move. The top three food service companies in North America—Aramark, Compass Group and Sodexo—have each taken actions to reduce their net-pen farmed salmon sales.

POLLING SHOWS 89% OF AMERICAN CONSUMERS ARE INTERESTED IN ECO-FRIENDLY PRODUCTS

For Greg Duppler, Target's senior vice president of merchandising, the message to customers was simple: "Target strives to be a responsible steward of the environment, while also providing our guests with the highest-quality food choices."^{ibid.}

North American supermarkets including WalMart, Supervalu US, Safeway, Kroger, Giant Eagle, Loblaw's, and Overwaitea Food Group have each made public commitments to sustainable seafood.⁸ These companies are looking to science-based information to guide their decisions around seafood purchases. As these sustainable seafood commitments mature, and companies look for guidance from conservation partners and published research, farmed salmon procurement will be fundamentally affected. Who will be next to make a major stand to remove the risk of net-pen farmed salmon from their supply line?

Market leaders are sending a clear message to their suppliers: **move to sustainable production.** Products like net-pen farmed salmon that are linked to severe environmental problems are not worth the risk to company brands.

CANADA'S CRISIS OF MISMANAGEMENT

The North American marketplace has already seen how regulatory and management failure of Chilean salmon farms can affect them with massive production failure, supply shortages and price fluctuations. Current Canadian management practices also present a risk for the North American marketplace.

6 <http://www.prnewswire.com/news-releases/target-eliminates-farmed-salmon-from-all-target-stores-82677657.html>

7 <http://www.compass-group.com/hse-excellence.htm>

8 <http://www.seafoodnews.com/NewsStory.aspx?StoryId=730772&TopicId=12835>; <http://fis.com/fis/worldnews/worldnews.asp?l=e&ndb=1&id=32680>

More than 75% of Canadian production was exported to the US in 2006.⁹ If you're buying fresh farmed salmon in North America chances are it is coming from Canada.

CONFLICTING MANAGEMENT MANDATES

Fisheries and Oceans Canada (DFO) is the lead federal government agency mandated by the Canadian constitution to ensure healthy aquatic ecosystems and to conserve and protect wild fish and fish habitat. At the same time, DFO has been given a political mandate to promote aquaculture. These two mandates are in fundamental conflict and this has resulted in failure to protect wild aquatic resources from aquaculture impacts.

In Canada, net-pen aquaculture is primarily promoted by DFO with assistance from the Department of Foreign Affairs and International Trade and the Atlantic Canada Opportunities Agency. DFO's promotion of open net-pens is being further developed and enhanced through the National Aquaculture Strategic Action Plan.¹⁰ The plan proposes an aggressive expansion strategy for finfish aquaculture, focusing on net-pens exclusively, with the aim to nearly double Canadian production in 10 years.

DENYING PUBLISHED SCIENCE

As the body of published, peer-reviewed research regarding the impacts of net-pen aquaculture on ecosystems has grown, the inability of DFO to balance their dual mandates has become increasingly evident. The Governments of Ireland, Scotland, Norway and Iceland have recognized that salmon farming can be hazardous to the environment, including the proliferation of sea lice on salmon farms which poses significant risk to wild salmon.¹¹ DFO, on the other hand, continues to deny and debate scientific evidence published in esteemed journals such as *Science*¹² and *Proceedings of the National Academy of Sciences*¹³ and has repeatedly demonstrated an unwillingness to acknowledge and address chronic problems on both the Atlantic and Pacific coasts).¹⁴

DFO's inability to incorporate local and traditional ecological knowledge or peer-reviewed science into their management decisions is a systemic and alarming shortcoming.¹⁵ Numerous consensus statements that recognize the impact of net-pen salmon farms have

9 <http://www.aquaculture.ca/files/production-markets.php>

10 <http://www.dfo-mpo.gc.ca/aquaculture/lib-bib/nasapi-insapa/nasapi-inpasa-eng.htm>

11 Routledge, R., P. Gallagher, and C. Orr 2007. Summit of scientists on aquaculture and the protection of wild salmon: convener's report. Simon Fraser University.

12 Krkošek, M., J.S. Ford, A. Morton, S. Lele, R.A. Myers, and M.A. Lewis. (2007) Declining wild salmon populations in relation to parasites from farmed salmon. *Science*. 318:1772-1775.

13 Krkošek, M., M.A. Lewis, A. Morton, L.N. Frazer and J.P. Volpe. (2006). Epizootics of wild fish induced by farmed fish. *Proceedings of the National Academy of Sciences of the USA*. 103:15506-15510

14 cf: <http://www.dfo-mpo.gc.ca/media/back-fiche/2005/salmon-eng.htm>

15 Report of the Auditor General to the House of Commons, 2004.

been developed by international scientists working on aquaculture issues¹⁶; however, DFO maintains nothing is wrong. This same pattern of entrenched denial by DFO allowed Canada's Atlantic cod stocks—one of the richest fishery grounds in the world—to collapse under its watch.

Canada's federal agencies are making bold claims about the sustainability of the open net-pen aquaculture industry. However, it is impossible to continue to ignore academic research, government agencies in other farmed salmon producing countries, and businesses that are using conservation science to guide their decisions.

WEAK REGULATION

The regulatory regime governing finfish aquaculture in Canadian coastal waters for over 25 years has failed to come to grips with some of the most fundamental aspects of the industry's impacts on the marine environment and on coastal communities. Public confidence in the ability of the Canadian government to protect wild fish and the marine ecosystems upon which many sectors depend, has been substantially eroded by continued reliance on scientifically weak regulatory measures, failure to objectively investigate knowledge gaps, and the absence of a process for resolving conflicts among resource users affected by net-pen farming. Provincial governments have been managing aquaculture to date. However, the federal government has always had the responsibility to ensure aquaculture does not harm wild fish populations or ocean ecosystems.

Basic requirements for sound management, such as science-based regulations, are largely absent for Canadian net-pen aquaculture. While the industry is dominated by global companies, global best practices are not implemented in jurisdictions like Canada.¹⁷ Useful monitoring data collected by the industry is not available to the public or independent scientists, and there is no current mechanism to ensure data reported to the government is accurate. If a regulation is broken, penalties are low, if enforced at all. The current Provincial government of British Columbia actually refunded industry fines levied by their predecessors.

Examples of weak regulation of net-pen salmon farms in Canada include:

- ▶ DFO is responsible for reviewing management plans as part of the Canadian Environmental Assessment Act, but they hold the salient details of these plans in confidence denying informed public input.¹⁸
- ▶ Only impacts near farm sites are considered in the

16 http://www.watershed-watch.org/publications/files/Aquaculture2007_final.pdf; [/Aquaculture_proceedings.pdf](http://www.watershed-watch.org/publications/files/Aquaculture_proceedings.pdf); [/FraserSockeyeThinkTankStatement.pdf](http://www.watershed-watch.org/publications/files/FraserSockeyeThinkTankStatement.pdf)

17 An Audit of the Management of Salmon Aquaculture for the Protection of Wild Salmon in British Columbia for the BC Pacific Salmon Forum, May 9, 2006 by Gareth Porter

18 http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200911_01_e_33196.html#hd5i

environmental assessment process. Far-field impacts and cumulative effects from multiple salmon farming operations are ignored.¹⁹

- ▶ Tenures are approved that allow a dense concentration of net-pen farms in biologically diverse areas, including a UN biosphere reserve, designated rockfish conservation areas, and along wild salmon migration routes that expose vulnerable wild juvenile salmon to sea lice and disease.¹⁹
- ▶ Scientific evidence that implicates salmon farming as a significant threat to wild salmon has been conducted while companies have been largely compliant with Canadian regulations and management requirements.²⁰ This demonstrates that current regulations are inadequate for protecting wild salmon.
- ▶ Only minimal monitoring of the effects of waste around net-pen farms is conducted and no objective science from Canada indicates management practices have improved. Reports of farm waste and chemicals affecting First Nation's clam beds, wild prawn and lobster are common.
- ▶ Thresholds used for monitoring free sulphide levels and oxygen in sediments are set too high to prevent loss of biodiversity under net-pens.²¹ When free sulphide thresholds are surpassed, leaving the site empty of fish for a specified time is all that is required, no additional remediation measures are instituted.
- ▶ Despite new guidelines for net strength and pen system anchoring, more farmed salmon escapes were reported in 2008 in British Columbia than in the previous three years combined. Over 100,000 farmed fish escaped into the wild in 2008,²² but no charges were laid and no fines levied.²³
- ▶ In 2008, five farm sites exceeded production limits contrary to provincial regulations,²⁴ but no charges were laid and no fines levied by any level of government. The four instances where charges were laid that year, for a variety of offenses, resulting fines were all less than \$200.²⁵
- ▶ Numerous farms exceeded maximum sea lice levels set out in the provincial Sea Lice Management Policy. Again, no charges were laid and no fines levied.^{ibid.} In fact, sea lice levels do not have to be reported to the provincial government (or DFO), so there is no official record of how many farms are regularly exceeding required action triggers.

19 <http://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/rca-ac/areas-secteurs/sg-dg-eng.htm>; http://farmedanddangerous.org/uploads/image/maps/ff_nsog_migratory_route_may2009_v4%5B3%5D.pdf

20 cf. Orr, C. (2007). Estimated sea louse egg production from Marine Harvest Canada farmed Atlantic salmon in the Broughton Archipelago, British Columbia, 2003-2004. *North American Journal of Fisheries Management*. 27:187-197; Krkošek, M., J.S. Ford, A. Morton, S. Lele, R.A. Myers, and M.A. Lewis. (2007) Declining wild salmon populations in relation to parasites from farmed salmon. *Science*.318:1772-1775.

21 Brooks, K.M. A report prepared for the Technical Advisory Group, Care of the BC Ministry of Environment. Sept. 21, 2001; Bagarinao, T.U. Sulfide as a toxicant in aquatic habitats. 1993. *SEAFDEC Asian Aquaculture*. Vol. XV(3), pp. 2-4. (1993)

22 http://www.agf.gov.bc.ca/fisheries/escape/escape_reports.htm

23 http://www.agf.gov.bc.ca/fisheries/aqua_report/2008/aquaculture_inspection2008.pdf

24 <http://www.canada.com/vancouversun/news/business/story.html?id=44350b68-3c47-4291-a25b-520c4a96f700>

25 http://www.agf.gov.bc.ca/fisheries/aqua_report/2008/aquaculture_inspection2008.pdf



PHOTO: SALMON WITH LICE, S. PROBOSZCZ

DFO's failure to enforce protective changes within the industry is leading to a crisis of confidence in aquaculture management and hinders sustainability innovation by giving the net-pen industry a free pass to pollute and harm marine ecosystems.

SLIDING BACKWARDS ON SUSTAINABILITY

ORGANIC LABEL FOR NET-PEN SALMON

DFO is currently investing resources in supporting organic certification for the net-pen salmon industry in Canada. The US National Organic Standards Board voted in 2008 to disallow certification of net-pen fish farms where the reproduction or migratory routes of wild fish or other marine life could be impacted²⁶—a standard that would exclude net-pen operations on the Canadian Pacific coast and much of the Atlantic. Contrary to this precautionary approach, DFO is working behind closed doors with the salmon farming industry to develop standards that would allow net-pen salmon farms to be certified as organic.²⁷

Any Canadian salmon farm using open net-pen technology will have a host of environmental impacts—waste polluting the marine environment, fish escapes, marine mammal entanglements, the spread of parasites and disease, and the use of antibiotics and chemical treatments.

Yet, eco-labels are now appearing on net-pen farmed salmon. These eco-labels are masking bad practices as there is no evidence that they have improved performance.

26 <http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5056878>

27 Personal communications with Trevor Swerdfager, Director General, Aquaculture Management, Fisheries and Oceans Canada, James Smith, Director, Certification Sustainability Reporting, Aquaculture Management Directorate, Fisheries and Oceans Canada and Julie Belzile, consultant, Development of a National Organic Standard for Canadian Aquaculture.

GREAT LAKES TROUT AQUACULTURE FROM CONTAINMENT TO NETS

Aquaculture in Ontario originally consisted of many small land-based farms. Beginning in the 1980s, the Ontario government granted licenses to private companies to operate commercial-size net-pen farms in Georgian Bay/Lake Huron where the waters of the Great Lakes are most pure. Ontario is the **only** jurisdiction along the entire Great Lakes coastline that allows net-pen aquaculture in public waters. Net-pen aquaculture operations are specifically prohibited in Quebec and in all the US states that border the Great Lakes.²⁸

In Ontario, net-pen aquaculture companies are given access to public space at no charge. They are granted exclusive rights to use freshwater lots for industrial operations and they do not have to bear responsibility for discharge of wastes (including manure, excess feed and antibiotics) or remediation of environmental damage.²⁹ This free pass has enabled net-pen operators to externalize costs that land-based trout farmers currently pay. As a result, land-based operators are struggling to compete.

Despite past and continuing evidence that freshwater net-pen aquaculture is having negative effects on aquatic ecosystems,³⁰ DFO is adopting an “Ontario freshwater plan” authored by the net-pen association with no public consultation to date, which is solely net-pen focused. The DFO strategy has abandoned land-based options much-heralded for environmental sustainability, and has placed emphasis and funds on a net-pen initiative.³¹

ADDING MORE SPECIES AROUND NET-PENS: HOW MUCH OF A SOLUTION IS IT?

Integrated Multi-Trophic Aquaculture (IMTA) is being proposed as a solution to address some of the sustainability issues associated with salmon farms. The concept, growing species around the farms that can feed off waste, has been used in aquaculture for thousands of years in places like China. Seaweeds are added around salmon net-pens to remove some of the dissolved nitrogen waste. Mussels and sea cucumbers are added to remove some of the solid wastes from fish feces and uneaten feed.³²

The effectiveness and efficiency of IMTA in the salmon farming context has yet to be evaluated scientifically. While it is a good idea to grow food by more effectively using waste, it is important to put IMTA in the proper perspective.

28 <http://www.georgianbay.ca>

29 <http://www.jjc.org.php/publications/html/aquaculture/app09.html>; <http://lacheney.ca/protect/en/Home.htm>

30 *Can. J. Fish. Aquat. Sci.* 66(11): 1936–1948 (2009) | doi:10.1139/F09-121 | Published by NRC Research Press

31 Georgian Bay Assoc., Internal Report on DFO’s Action Plan Initiative 2009.

32 http://www.dfo-mpo.gc.ca/aquaculture/RD2009/rdpolyculture_02-eng.htm

The main impacts of salmon farms are: using more wild fish than they produce, disease and parasite transfer to wild stocks, water pollution, chemical pollution, habitat destruction under the cages, and the killing of local marine mammals. IMTA potentially minimizes only two of these impacts (water pollution and habitat destruction under the cages) and is not enough to make salmon farms environmentally friendly or sustainable.

SEA LICE EPIDEMICS AND CHEMICAL WARFARE

All regions of the world where salmon are farmed in net-pens battle sea lice. The higher density of farms and salmon in net-pens, the worse it can become. Atlantic Canada has been dealing with a very serious sea lice epidemic since the spring of 2009. The problem started to escalate from routine management to an epidemic when sea lice developed a resistance to the chemical of choice for the past decade, emamectin benzoate (EB).³³

In Canada, emamectin benzoate was only licensed for emergency use until 2009. Despite this classification, it was used 140 times from 2000 to 2003.³⁴ When EB was approved, the withdrawal time - the period between treatment and harvesting of fish - was cut from 25 days (in the Atlantic) and 68 days (in the Pacific) to zero nationally. While the manufacturer has stated that EB is “toxic to fish, birds, mammals and aquatic invertebrates,”³⁵ these changes were made without any publicly available information about the compound’s safety.

Three new chemical pesticides to treat sea lice were approved close to the same time: deltamethrin, teflubenzuron and azamethiphos. All three are administered as pesticide baths that require net-pens to be surrounded by tarps so that the fish in the farm bathe in the chemical solution. After treatment, the tarps are removed and the chemical is released into the ocean.³⁶

Recently, lobster fishermen in the Bay of Fundy found hundreds of dead and dying lobsters in areas near salmon farms. Testing revealed the lobsters were poisoned by cypermethrin, a chemical that has not been approved by Health Canada, but is used to kill sea lice on European salmon farms.³⁷

This is not the first time this illegal chemical has been deployed in Canada. In 1995, an anonymous memo referred to as the “cookbook” circulated, instructing salmon growers on the illegal use of Ripcord® (active

33 <http://telegraphjournal.canadaeast.com/opinion/article/963998>

34 Cox, S. K. (2004). Diminishing Returns: An investigation into the five multinational corporations that control British Columbia’s salmon farming industry. British Columbia: Raincoast Conservation Society.

35 Schering-Plough Animal Health Corporation, Potential environmental impacts of emamectin benzoate, formulated as SLICE®, for salmonids. 2002, Schering-Plough Animal Health Corporation: Union, NJ. p. 36.

36 <http://telegraphjournal.canadaeast.com/opinion/article/963998>

37 <http://www.cbc.ca/canada/new-brunswick/story/2010/02/18/nb-aquaculture-pesticide-bay-of-fundy-lobster-deaths-658.html>

ingredient, cypermethrin).³⁸ One grower was convicted of using the pesticide illegally on his farm and fined \$500, a small price to pay to save his salmon. According to an investigator, there was “extensive unregistered use of cypermethrin by salmon growers. Enforcement would be extremely difficult because the growers can just wait until we are not around and then treat the salmon and residues in the water and fish would be virtually undetectable.”³⁹

DFO is not conducting adequate research into the impacts of chemical lice treatments on crustaceans, including commercially important species such as crabs, prawns and lobsters.⁴⁰ The industry still refuses to post notices or alert recreational and commercial fishermen when chemical treatments are in use. Combined with evidence of growing resistance, it is apparent that chemical treatments are not a viable long-term solution to the unavoidable problem of sea lice infections of net-pen farmed salmon.

REAL SOLUTIONS THROUGH INNOVATION

Whether sited on water or land, closed-tank systems can eliminate escapes, eliminate or greatly reduce the risk of disease and parasite transfer to wild salmon, and provide employment opportunities closer to communities. When coupled with advances in feed that significantly reduce the dependence of aquaculture on wild-caught fish, closed containment can deliver a sustainable model for aquaculture. To achieve this, government and industry must change the focus of their research and investment in aquaculture towards the full implementation of closed containment technology.

BENEFITS OF CLOSED CONTAINMENT

- › Develop an environmentally superior salmon aquaculture industry;
- › Protect wild salmon and the environment;
- › Respect Aboriginal rights and title;
- › Support coastal economic development;
- › Reduce consumer confusion by providing a clear sustainable choice.

Seafood buyers and consumers drive innovation that fosters sustainability. Support of closed containment is already being voiced by large and small players in the retail and food service sectors in North America who are seeking a sustainable supply of farmed salmon. Externalizing costs and disregarding the long-term impacts of our day-to-day decisions is quickly becoming



PHOTO: NEPTUNE INDUSTRIES, FLORIDA USA

an outdated way of doing business and living our lives. Changing the type of production system used for salmon farming is one choice that has the potential to have a lasting impact.

The model for sustainable salmon aquaculture already exists. Small to medium scale operators have proven it can be done.⁴¹ Applying this groundbreaking innovation more broadly will deliver greater results. We can protect wild salmon, marine ecosystems, and find long-term solutions to the environmental impacts of aquaculture by supporting the development of operations that can truly meet sustainability needs. Solutions that improve the stability of seafood supply, more efficiently use marine resources, and meet demand for sustainable products will be a win-win-win for the environment, business, and consumers.

38 Salmon farmers' deadly chemical 'cookbook', Saint John Times Globe, October 12, 1996.

39 Memo from S. Stehouwer, DPO Pesticides and Plant Products, Fredericton to Neil McTierman, RPO Pesticides, Moncton (PMRA), October 4, 1995. Obtained under the Access to Information Act, July 31, 1997.

40 Burrige, L, Haya, K. and S. Waddy. 2004. "Chemicals to control sea lice infestations: What we know about their effects on lobster," in Hargrave 2004.

41 <http://www.scientificamerican.com/article.cfm?id=coho-salmon-farming>;
<http://www.farmedanddangerous.org/uploads/File/Reports/ClosedSystemAqua-FINAL.pdf>

APPENDIX 1



Re: Cage Aquaculture in Ontario

The Georgian Bay Association is an umbrella organization for 22 community associations along the eastern and northern shores of Georgian Bay. We have been speaking up for the interests of the owners of 3,200 member properties and around 18,000 residents who use these properties since 1916.

The GBA feel that the Ontario government's and DFO's support for cage aquaculture contradicts the spirit if not the content of the various pacts that have been signed by the eight Great Lake States and the governments of Ontario, Quebec and Canada over the years. The Great Lakes Water Quality Agreement for example is touted as "an example for the world". "The international community regards it as a successful model for inter-jurisdictional cooperation towards restoring environmental quality and preventing future degradation, thereby ensuring long-term protection of the Great Lakes Basin Ecosystem." (excerpts taken from Environment Canada web site)

The commercial, for profit, growing of fish in open cages/nets in public water lots, can have several negative impacts on the ecosystem of the Great Lakes. At least a few of the Great Lake States have banned cage aquaculture for these reasons.

Michigan - "At this time, the State of Michigan opposes the development of cage aquaculture systems in Great Lakes waters in our state. This is for three main reasons: a) the lack of any waste treatment by these facilities and the use of public trust lands as their waste treatment system; b) the inability of these facilities to ensure their fish do not escape and potentially affect self-sustaining and stocked fish populations; and 3) the lack of any potential fish pathogen containment from these facilities."

Gary E. Whelan- Fish Production Manager. MI DNR Fisheries Division

Ohio – "It's against the law to raise fish in public waters for private aquaculture in Ohio; Ohio Administrative Code 1501:31-39-01 and Ohio Revised Code 1533.632" Elmer W. Heyob Jr.- Fish Hatchery Administrator, Ohio Division of Wildlife Roger L. Knight- Lake Erie Fisheries Program Administrator, ODNR Division of Wildlife

Over and above these international/ecological issues we believe that the Ontario government is perpetuating a two tier system for farmers with its support of cage aquaculture. Not only do cage aquaculture feedlots operate in public waters at no cost but they are allowed to flush their nutrients untreated into the commons. These fish feedlot operators compete with land based feedlot operators (hogs, beef, chicken and fish) to meet the common protein food demand of consumers without having to incur the cost of the nutrient management systems that the land based operators are subjected to. This offers a distinct, and we believe unfair, competitive advantage to the cage operators. From a nutrient through put perspective, we have calculated that the current level of the total cage aquaculture production in Ontario is equivalent to an 8000 market hog operation, taking land grown nutrients and releasing them untreated into public waters.

We have considerable respect for the hard work and entrepreneurial spirit of the operators of the cage facilities already in place. We would like to see these operators have access to government funding to migrate their operations to land based locations and/or closed containment systems where the growth of the aquaculture industry can be fully monitored, properly regulated and sustainably achieved.

Bob Duncanson
Executive Director
(416) 219-4248