



# Stand Up for Pacific Salmon

## Net-Pen Salmon Farms: A Global Problem

Since the mid-eighties, aquaculture corporations have used the pristine coastal habitats of Ireland, Scotland, Norway, Chile and British Columbia to site their Atlantic salmon feedlots. Peer-reviewed research is conclusive, and consensus exists among fisheries biologists: where net-pen salmon farms exist, wild salmon and trout decline<sup>1</sup>.

In Scotland and Ireland, runs of once sea-trout fed a thriving tourist industry on many rivers. When salmon farms appeared near those rivers, runs of 20,000 fish collapsed into the hundreds.<sup>2</sup> This has happened again in BC waters—which has thousands of times as many fish to lose—as has been well documented by Alexandra Morton and other researchers.<sup>3</sup>

Currently the Fraser River in British Columbia, home to the largest spawning population of salmon in the province, is enduring a catastrophic crash of its sockeye population. While net-pen salmon farms are only one of many impacts on these fish, in an era of acidifying oceans and warming rivers—and other climate change variables like the increase in some aquatic diseases—they are one that can and must be removed.

The net-pen salmon farm industry is also present in Washington State, and has been promoted as a sustainable industry by Senator Dan Swecker, who in 2005 wrote, apparently without irony, that “sea lice exposure to wild stocks, toxic contaminants, impacts on the environment and impacts of escapes on wild salmon... have been studied by government agencies and have been determined to be without merit.”<sup>4</sup> Salmon advocates in Washington need to beware of the creeping effects of government-industry collusion.

In February, Georg Rieber-Mohn, ex-attorney general of Norway who battled with the net-pen salmon farm industry there, issued a warning to countries opening their waters to the industry: “If you want to protect wild salmon then you have to move salmon farms away from migration routes.... Last year, I was honoured to meet with sea lice scientist Alexandra Morton in Oslo. I listened with a sense of déjà vu as she outlined how Norwegian companies

<sup>1</sup> Ford JS, Myers RA (2008) A global assessment of salmon aquaculture impacts on wild salmonids. PLoS Biol 6(2): e33. doi:10.1371/journal.pbio.0060033. See also L. Neil Frazer. Sea-Cage Aquaculture, Sea Lice, and Declines of Wild Fish. Conservation Biology, 2008; DOI: 10.1111/j.1523-1739.2008.01128.x. See also Hutchinson P, editor (2006) Interactions between aquaculture and wild stocks of Atlantic salmon and other diadromous fish species. Proceedings of an ICES/NASCO Symposium held in Bergen, Norway, 18-21 October 2005. ICES J Mar Sci 63:(7).

<sup>2</sup> Hume S, Langer O 2004 et al. *A Stain on the Sea*, p. 30-33.

<sup>3</sup> Krkosek M, Ford JS, Morton A, Lele S, Myers RA, Lewis MA. Declining wild salmon populations in relation to parasites from farm salmon. Science. 2007 Dec 14;318(5857):1772-5.

<sup>4</sup> <http://www.wfga.net/issues.php?ID=68>

are spreading sea lice to wild salmon... I was struck by a strong sense of solidarity and eerie familiarity. Yet there is still hope for wild salmon in both Norway and Canada. With the world watching there is a growing sense of public awareness globally and a passion to save wild salmon.”

## The Harm from Net-Pen Salmon Farms -- Not Just Sea Lice

### Sea Lice

Many citizens are aware—as the cartoon in this kit shows— that net-pen salmon farms are devastating populations of wild salmon with sea-lice. One modeling study by biologist Craig Orr estimated that over a billion sea-lice eggs were produced by only 12 British Columbia farms—and this in only a two-week period prior to the out-migration of wild juvenile salmon!<sup>5</sup> Net-pen salmon farmers claim they have taken precautionary measures, attempting to reduce their sea-lice loads by treating the fish with a shellfish-killing toxin, emamectin benzoate (“SLICE”). It is true that SLICE can reduce lice loads. Unfortunately the treatment is short-term, toxic to resident shellfish like prawns, and lice numbers often rebound before the wild juvenile salmon get to sea. Alexandra Morton’s recent trip to Norway confirmed that sea lice are becoming resistant to SLICE and will require ever more toxic drugs. Closed-containment tanks would solve this problem.

### Disease

However, lice are only the tip of the iceberg. What the public hasn’t been told by government or industry is the rest of the story: the effects, current and potential, on wild stocks of farm-bred diseases like infectious hematopoietic necrosis (IHN) and the vicious ISA disease that wiped out salmon farms in Chile. IHN exists naturally in Pacific waters, but has found a new viral niche in dense populations of farmed salmon. The disease ran rampant through BC’s Johnson Strait in 2001-2003—so much so that millions of farmed fish had to be culled.

Despite a 2005 petition to Canada’s Auditor General by a coalition of groups—the Georgia Strait Alliance, the United Fishermen and Allied Workers Union, and the David Suzuki Foundation— Fisheries and Oceans Canada (known by its old acronym, DFO, for Department of Fisheries and Oceans) has not released data on the effects of IHN or other farm-bred diseases on wild stocks.<sup>6</sup> It appears the agency has refused to undertake any such studies. Why? Apparently because neither industry nor the DFO—which is mandated to promote aquaculture—wants to find out any bad news. And neither Canadians, Americans, nor anyone who holds salmon and biodiversity as a sacred trust, have apparently any legal right to demand that these studies be done.

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<sup>5</sup> 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.

<sup>6</sup> Georgia Strait Alliance petition to the Auditor General on DFO malfeasance, 9 June 2005. <[http://www.oag-bvg.gc.ca/internet/English/pet\\_148A\\_e\\_28877.html](http://www.oag-bvg.gc.ca/internet/English/pet_148A_e_28877.html)>

## Waste

The ocean is vast, but does not render pollutants harmless by dilution. Indeed, the density of fish farms in British Columbia contributes to concentrated waste pollution that is not restricted to areas near the farms. The impact of toxicity, lower dissolved oxygen, and suspended solids on benthic and intertidal organisms can be widespread.

As well, some B.C. fish farms paint their nets with a highly toxic copper solution to prevent marine organisms like barnacles and mussels from growing on the nets.

Fish farms produce an astounding quantity of waste, which has similar impacts to those of municipal sewage. One B.C. fish farm can dump waste equivalent to between 2,250 and 5,580 people.<sup>7</sup> In 2003, the B.C. salmon farming industry discharged approximately 1435 mt to 2100 mt of nitrogen—equal to that of three million people—contributing greatly to ocean eutrophication and subsequent ecological impacts.<sup>8</sup>

Fish farm waste consists of fish feces, uneaten food pellets, drugs and drug residues, pesticides, fungicides, and feed additives, including toxic metals. This untreated waste spills through the cages into the open ocean and onto the ocean floor. It collects at the bottom of the ocean, smothering the sea floor under the farms. As this layer breaks down, it consumes oxygen vital to shellfish and other bottom-dwelling sea creatures. These areas are left devoid of living fauna as fish farms change locations. The waste left behind can leave the seabed unlivable for other marine life for up to five years after farms have relocated.

## Not Just Salmon: Humans and Marine Mammals

### Seals, Orca, and Sea Lions

Salmon aren't the only victims of net-pen salmon farms. Seals quickly figured out how to pluck farmed salmon from net pens, and in the late eighties the DFO handed out permits for farm employees to shoot them. Between 1989 and 2000, 6,243 seals and sea lions were legally shot.<sup>9</sup> The number illegally killed or unreported by net-pen salmon farmers is, of course, unknown.

According to Raincoast Research, in 1993, acoustic harassment devices (AHDs) were introduced to discourage seals, broadcasting 198 db (the level of a jet engine at take-off) to cause pain in the seal's ears. "The moment the devices were turned on harbour porpoise evacuated the archipelago and tried to move into Dall porpoise territory in the deeper waters of Blackfish Sound and Queen Charlotte Strait. The orca left, displaced from over 150 square kilometers of their traditional territory. It was as if a door had been slammed in their faces."<sup>10</sup> After pressure from researchers, the farmers turned the devices off in 1999. Orca have begun to return, but their presence and usage of the area is "highly sporadic and

<sup>7</sup> Folke, C., Kautsky, N., and Trelle, M. 1994. The costs of eutrophication from salmon farming: Implications for policy. *Journal of Environmental Management* 40: 173-82.)

<sup>8</sup> Goldberg, R., Naylor, R. 2005. Future seascapes, fishing, and fish farming. *Front Ecol Environ*; 3(1): 21-28.

<sup>9</sup> <http://www.farmedanddangerous.org/page/marinemammaldeaths>

<sup>10</sup> <http://www.raincoastresearch.org/salmon-farming.htm>

disrupted.”<sup>11</sup>

## Consumer Health

PCBs are persistent, cancer-causing chemicals that were banned in the United States in 1976. Because of the presence of PCBs and other substances, research recommended that in order not to exceed an elevated cancer risk, no more than “between 0.4 and 1 meal per month of farmed salmon should be consumed.”<sup>12</sup>

Farmed salmon are given chemical additives to enhance their colour—which would otherwise be an unappealing grey. These are considered harmless, but drugs and chemical additives given to farmed fish pose a number of concerns for human health. Antibiotics—thousands of kilograms per year— and biocides like SLICE are used to control diseases and parasites in net pens. Consumers around the world are turning away from meat and dairy products produced in feedlot conditions that necessitate the use of antibiotics.

A study in the *Journal of Nutrition* regarding omega-3 fatty acids stated that “young children, pregnant women and nursing mothers ... can minimize contaminant exposure by choosing the least contaminated wild salmon or by selecting other sources of omega-3 fatty acids. Farmed salmon are fatter than wild salmon, and as such contain much higher levels of fat soluble pollutants.”<sup>13</sup>

## Not a BC Industry—Not Even a Canadian Industry

With few exceptions, the net-pen salmon farm industry in Canada is not a Canadian industry, nor do its profits remain in Canada. Ninety percent of BC’s 130 salmon farm licenses are owned by three Norwegian multinationals: Marine Harvest, Cermaq and Grieg.

Grieg has 785 shareholders. 722 of them are based in Norway.<sup>14</sup>

Sixty-five percent of Cermaq’s stock is Norwegian owned. The rest is owned by American and European shareholders and investment agencies like Morgan Stanley.<sup>15</sup>

Marine Harvest’s top 20 shareholders are foreign banks and investment firms, including Citibank, Morgan Stanley, and JP Morgan Chase. 95% of their stock is owned by investors in Norway, Britain, Belgium, Cyprus and the US.<sup>16</sup>

These three corporations own salmon feedlots in BC and around the world, from Scotland to Chile. It is unclear whether or not their shareholders know about our oceans, wild species like salmon or the intricacies of ecosystem management. However, if they do, they do not appear to value them except as a place to reap short-term profits. NGOs, First Nations

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<sup>11</sup> <http://www.raincoastresearch.org/salmon-farming.htm>

<sup>12</sup> Huang, et al, *Consumption Advisories for Salmon Based on Risk of Cancer and non-Cancer Health Effects*. *Environmental Research* 101 (2006) 263-274

<sup>13</sup> Georgia Strait Alliance. (<http://www.georgiastrait.org/?q=node/442>) Accessed April 16, 2010.

<sup>14</sup> Grieg 2008 Annual Report. <[www.griegseafood.ca](http://www.griegseafood.ca)>

<sup>15</sup> Cermaq 2008 Annual Report. <<http://www.cermaq.com/>>

<sup>16</sup> Marine Harvest Annual Report. <<http://www.marineharvest.com/en/Investor1/Financial-info/Reports/>>

leaders like Chief Bob Chamberlin, and researchers like Alexandra Morton have approached these corporations repeatedly, entreating them to do the right thing. But because making needed changes will lessen their profit margins, they won't—*unless customers demand it.*