
The Aquaculture Controversy in Canada

Nathan Young and Ralph Matthews

The Aquaculture Controversy
in Canada: Activism, Policy, and
Contested Science



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For my family

— NY

*In gratitude to my mentors, whose wisdom,
encouragement, and support set me on my career path:*

*Ian Whittaker, Roger Krohn, Noel Iverson,
Don Martindale, Reuben Hill, and George Park*

— RM

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Abbreviations

AAA	Aboriginal Aquaculture Association
AAC	Aquaculture Association of Canada
AANS	Aquaculture Association of Nova Scotia
AFPR	Atlantic Fisheries Policy Review
AOA	Atlantic Opportunities Agency
ASF	Atlantic Salmon Federation
BCAFC	British Columbia Aboriginal Fisheries Commission
BCLP	British Columbia Liberal Party
BCSFA	British Columbia Salmon Farmers Association
BCSGA	British Columbia Shellfish Growers Association
CAAR	Coastal Alliance for Aquaculture Reform
CAIA	Canadian Aquaculture Industry Alliance
COABC	Certified Organic Associations of British Columbia
DFO	Department of Fisheries and Oceans
DSF	David Suzuki Foundation
EA	environmental assessment
EACSR	External Advisory Committee on Smart Regulation
ENGO	environmental nongovernmental organization
FAO	Food and Agriculture Organization of the United Nations
FDA	First Dollar Alliance
FFAW	Fish, Food and Allied Workers Union
HADD	Harmful Alteration, Disruption, or Destruction
IFOAM	International Federation of Organic Agriculture Movements
NAIA	Newfoundland Aquaculture Industry Association
NBSGA	New Brunswick Salmon Growers Association
NDP	New Democratic Party

NSERC	Natural Sciences and Engineering Research Council of Canada
NSGA	Newfoundland Salmonid Growers Association
OCAD	Office of the Commissioner for Aquaculture Development
PAA	Positive Aquaculture Awareness
PCB	polychlorinated biphenyl
PEIAA	Prince Edward Island Aquaculture Alliance
POP	persistent organic pollutant
POSA	Pacific Organic Seafood Association
RADAC	Regional Aquaculture Development Advisory Committee
SAC	Shellfish Advisory Committee
SAIAC	Salmon Aquaculture Implementation Advisory Committee
SAR	Salmon Aquaculture Review
SCA	Seafood Choices Alliance
SCSA	Special Committee on Sustainable Aquaculture
SDI	Shellfish Development Initiative
SSHRC	Social Sciences and Humanities Research Council of Canada
UBCIC	Union of British Columbia Indian Chiefs
UFAWU	United Fishermen and Allied Workers' Union
WED	Western Economic Diversification
WWF	World Wildlife Fund

Introduction

On the morning of 17 December 2002, members of the Heiltsuk First Nation, along with several environmentalists and commercial fishers, dock fourteen boats at the remote community of Ocean Falls on British Columbia's rugged central coast. The group, numbering nearly sixty, force open the gate to a construction site for a salmon hatchery owned by Omega Salmon, one of the largest aquaculture operators in Canada. Protesters vandalize the site, pulling up the newly poured foundations of the structure. Greg Higgs of the Forest Action Network tells the media: "People are fed up with fish farms. You can expect more protest and more pressure on fish farm companies in the future." Ed Newman, a Heiltsuk elder, is more blunt: "We've declared war on the fish farming industry. They might have to throw a lot of us in jail, but we don't care. We have to protect our way of life."¹

On 9 January 2004, the internationally renowned journal *Science* publishes an article by University of Indiana chemist Ronald Hites and several colleagues entitled "Global Assessment of Organic Contaminants in Farmed Salmon." The findings include evidence that aquacultured salmon contain significantly higher concentrations of toxic polychlorinated biphenyls (PCBs) than their wild counterparts. The paper's recommendations touch off a maelstrom, as the authors argue that consumers ought to restrict intake of farmed salmon to one serving every two months due to elevated cancer risks. Health Canada, the Canadian Food Inspection Agency, and the United States Food and Drug Administration immediately repudiate the findings, citing the importance of salmon as a source of omega-3 fatty acids,

which are essential to the prevention of heart disease. Industry representatives react to the article with venom. In a letter to *Science*, veterinarian and longtime industry booster Brad Hicks writes that “the authors appear to have an agenda beyond the reporting of scientific information ... This is not science. This is politics. This type of report belongs in a political publication where yellow journalism is considered an art.”²

In the midst of the 2005 provincial election campaign, Carole James, leader of the British Columbia New Democratic Party, is ambushed at a rally in the District of Port Hardy on northern Vancouver Island. Nearly fifty protesters drown out James’ speech, chanting, “You’ll be in the poor house with the rest of us, Carole!” The hecklers wave signs reading, “Aquaculture Feeds Families” and “We Are Working Environmentalists.” They are incensed at the NDP’s election pledge to forbid expansion of the salmon farming industry and phase out current technologies. After the incident, James remarks to a journalist: “It’s my understanding jobs will be lost anyways, because people are losing their taste for farmed fish.”³

In August 2005, crab fishers and residents of Chance Harbour on the Bay of Fundy in New Brunswick begin a boycott of aquaculture products. “[Aquaculture] operations are coming to industrialize New Brunswick’s shoreline,” says an organizer. “This is one of the last remaining stretches of undeveloped coastline west of Saint John. I don’t know if there’s any more coastline that is as scarce or as spectacular. It’s almost sacred.”⁴

On 11 October 2005, the Emmy Award-winning ABC television series *Boston Legal* airs an episode in which characters Alan Shore and Denny Crane (played by actors James Spader and William Shatner) vacation in British Columbia, only to discover that wild salmon populations are threatened by sea lice infestations originating from local aquaculture operations. The episode centres on a legal showdown pitting Shore and Crane against industry representatives in a (fictional) courtroom in Port McNeill on Vancouver Island. Mary Ellen Walling, executive director of the BC Salmon Farmers Association, tells the *Vancouver Sun*, “What possible

relevance can this have? It's a fictional American television show. William Shatner may be a good actor ... but what possible knowledge could he have of fish biology?"⁵

In 2006, the government of British Columbia strikes a Special Committee on Sustainable Aquaculture to hold public hearings in coastal cities and small communities affected by aquaculture development. The committee hears every imaginable opinion on aquaculture, many of them highly emotional. The committee itself is often strongly rebuked by witnesses. Peter Siwallace, a Hereditary Chief of the Nuxalk Nation states: "I know what recommendations are about. You guys can make recommendations until the cows come in. But would somebody listen to the recommendations? I've got a feeling that the decision is already reached ... I cannot help but think of what happened to the buffalo with the Plains Indians. In order for [settlers] to get the Plains Indians under control, they had to kill off the buffalo. To me, what's happening here is similar. Our fish are being depleted ... You know, there's a reason why we're called First Nations people. We were the first people here on this continent. We were put here by our Creator. You guys were put over in Europe. We accept that fact. You have to accept that fact also." (British Columbia 2006a)

What is going on here? In the past twenty-five years, aquaculture has emerged as one of the most promising but controversial new industries in Canada. Aquaculture, or the farming of aquatic organisms, has been hailed as a potential solution to serious environmental and food supply problems stemming from global overfishing. To critics, however, it has a dark side that poses unacceptable threats to the environment, human health, and local stakeholders. This conflict has mushroomed over the past several decades to become one of the most bitter and stubborn face-offs over industrial development ever witnessed in Canada. The aquaculture industry and its critics are currently locked in a political and cultural struggle that reaches across courtrooms, laboratories, governments, newsrooms, scholarly journals, and virtual and street-level activism.

This is not a book about aquaculture in the conventional sense. It contains only brief discussions of aquaculture techniques, methods, and alternatives. Rather, this is a book about the aquaculture *controversy* – it is an investigation into one of the most divisive and intense struggles over industrial

development ever to have taken place in Canada. As such, it is not our intention to reach conclusions about the desirability or sustainability of Canada's aquaculture industry. As we will see, there is no shortage of voices arguing for and against aquaculture development in this country. Rather, we draw on several major research initiatives that we have undertaken over a seven-year period, to present a much-needed analysis of *why* the controversy exists and *how* it is perpetuated.

This book has two aims. First, we look to *analyze* the contours of the aquaculture controversy in Canada – to ask what it is about the collision of interests and claims concerning this industry that is so contentious and divisive. Second, we aim to *explain* the controversy, or at least significant elements of it, by investigating how aquaculture fits in with some of the broader dilemmas and contradictions facing Canada and the world today. We argue that aquaculture has become symbolic of many things to many different people and groups in this country. It has become a metaphor, both positively and negatively, for difficult questions about the collision of humanity and environment, notions of rights and justice, and the rise of intense local/global interactions and conflicts. These are big issues that are increasingly coming to the fore in conflicts over industrial development around the world. Understanding the aquaculture controversy in Canada, therefore, also has relevance beyond this sector and beyond this country. As we will see, one of the reasons why aquaculture is so controversial in Canada is that it is a latecomer – a new claimant to already fragile ecological, economic, and cultural spaces. For this reason, the story of Canadian aquaculture is likely to resonate in many parts of the world dealing with new industries and development in an age of globalization, environmentalism, and the assertion of local rights.

What Is Aquaculture?

At its most basic, aquaculture involves extending the principles of agriculture to marine environments. It typically encompasses the commercial husbandry of fish, plants, and/or shellfish in contained or semi-contained spaces in fresh or ocean waters. For swimming fish or “finfish,” this usually involves the suspension of nets in nearshore ocean waters, or more simply the stocking of small lakes and pools for later harvest. Shellfish aquaculture usually involves the seeding of artificial habitat (such as bags or socks that are suspended from pontoons) that is then enclosed as private property.

Aquaculture is an ancient activity, and has been practised for millennia in parts of Africa, Asia, and Europe. Globally, most aquaculture still resembles its ancient form, in which families, communities, and small enterprises stock and feed freshwater species in ponds on a small scale, typically as a supplement to agricultural or fishing activities (FAO 2006). Aquaculture has also recently become big industry and big business, however. Many aquaculture

operations are now large-scale, highly mechanized, and owned or backed by some of the world's largest food companies.

The current global controversy over aquaculture is therefore really a controversy over newer, industrial-scale aquaculture. For proponents, aquaculture is simply following the path of terrestrial agriculture, which underwent a "green revolution" in the latter half of the twentieth century, in which family farms gave way in many parts of the world to consolidated or factory-farms that increased productivity from the land by creating economies of scale and investing heavily in irrigation, fertilizers, and pesticides. For supporters of the industry, aquaculture promises a similar "blue revolution" that can harness the full productive potential of marine spaces while reducing pressures on rapidly depleting wild fish stocks (e.g., Economist 2003). For many opponents, however, large-scale aquaculture represents an unjustifiable privatization and industrialization of the oceans. Marine ecosystems are complex and mobile, and cannot be enclosed or isolated from the environmental effects of aquaculture. In opponents' view, high-intensity aquaculture (particularly shrimp and salmon farming) are serious intrusions that may disrupt or destroy ecosystems that are already fragile from years of exploitation and pollution.

There is no mistaking the fact that aquaculture is now a major global industry. According to statistics from the Food and Agriculture Organization of the United Nations (FAO), aquaculture now constitutes roughly one-third of total world fisheries harvest (a total of 52 million tonnes in 2006, nearly double the 27 million tonnes recorded in 1996), and has an annual commercial value of over US\$78 billion (FAO 2008, 6). In Canada, aquaculture now dwarfs traditional wild-capture fisheries in some regions of the country. Overall, aquaculture production in Canada has expanded more than three-fold from 1991 to 2007 (from 50,000 tonnes to 170,000), although production has recently levelled off due to fierce international competition in aquaculture markets (Statistics Canada 2008). In British Columbia, aquaculture produced 72,000 tonnes of salmon valued at Cdn\$364 million in 2007. In comparison, the once-mighty wild-capture fishery landed only 20,000 tonnes of salmon valued at \$41 million in the province that same year (British Columbia 2008a).

The Aquaculture Controversy in Canada: An Introduction

Canada is home to both shellfish and finfish aquaculture. These subsectors are structured differently, and are controversial for different reasons. According to some, shellfish aquaculture in Canada can be traced back to Aboriginal harvesting and maintenance of natural clam beds (Tollefson and Scott 2006; British Columbia 2006a). Since the late 1970s, however, shellfish aquaculture has involved the private enclosure of selected nearshore areas for highly controlled seeding, growth, and harvesting, mostly on artificial habitat.

There are several major shellfish aquaculture companies operating in Canada, as well as hundreds of smaller ventures and family businesses. While some Aboriginal groups are directly involved in shellfish aquaculture, the majority of shellfish operations are owned by non-Aboriginal firms and entrepreneurs. The shellfish sector is also relatively small, accounting for only 10 percent of the total value of Canadian aquaculture.

Finfish aquaculture in Canada involves both freshwater and saltwater species. The most common freshwater species is rainbow trout, which is typically raised in ponds on private property, or else in cages or nets that are suspended in lakes (Michalska 2005). Like shellfish aquaculture, most trout-farming operations are small and family-owned. Salmon aquaculture is the largest and most lucrative area of Canadian aquaculture, representing 75 percent of the industry's total value. While salmon aquaculture in Canada was once dominated by small businesses, it is now the near-exclusive province of large firms, many of which have multinational operations. Salmon aquaculture is also the most controversial subsector of the industry. While criticisms of shellfish and freshwater aquaculture are becoming more common (e.g., Deal 2005; Michalska 2005), salmon aquaculture is the primary target of activism. Environmentalist groups and other opponents routinely accuse the salmon aquaculture industry of causing serious environmental damage, threatening human health, and violating stakeholder rights. Supporters of salmon aquaculture have countered these allegations primarily by arguing that the industry has a minimal environmental footprint and is a major source of employment and stability in economically distressed coastal communities (e.g., Bastien 2004).

Four Main Axes of Controversy

The controversy over aquaculture in Canada is complex and multidimensional, involving competing claims from many different actors. As we will discuss in Chapters 1 to 3, environmental and industrial conflicts have become more complex in recent years because of greater public sensitivity to issues of risk and uncertainty, the diffusion of knowledge- and information-generating capacities to non-traditional actors (including environmentalist and other activist groups), and greater political sensitivity to stakeholder and citizen rights (Irwin 1995; Fischer 2000). Governments and industries, which for a long time enjoyed the final word on development and risk management, are still learning how to deal with such complexities. Leiss (2001) uses the apt metaphor of a labyrinth to describe the volatility that results from the involvement of activists and an empowered public in issues that were previously settled in boardrooms and government offices. As we will see throughout this book, the aquaculture controversy is indeed labyrinthine, as new claims and information about aquaculture are constantly

Figure 0.1

Major axes of the aquaculture controversy in Canada

Axis	Key points of contention
Environment	Does industry belong in marine environments? Does aquaculture threaten or benefit wild fish stocks and other aquatic species?
Human health	Is aquaculture beneficial or harmful to human health?
Rights	Is it acceptable to enclose “public” marine spaces for private gain? Does aquaculture disrupt local and/or Aboriginal rights and claims?
Rural development	Is aquaculture beneficial or harmful to rural development and well-being?

emerging and interacting with people’s hopes, fears, and ideas about fairness and justice.

Although the aquaculture controversy is complex, patterns can be observed in the conflict. The aquaculture labyrinth in Canada is composed of four main axes or dimensions: the environment, human health, rights, and rural development (Young and Matthews 2007a). As mentioned, these apply most intensely to salmon aquaculture, but also to shellfish and freshwater aquaculture. Each axis represents an identifiable master theme in the aquaculture debate, although the lines among these are often blurred in real-world conflicts and narratives. Figure 1 summarizes the main points of contention between supporters and opponents of aquaculture in Canada across these dimensions.

Environment

Like all resource industries, aquaculture intrudes on the natural environment. Supporters argue that the industry is a legitimate user of marine spaces that should have equal rights and access to the oceans with commercial fishers and other traditional users (e.g., Bastien 2004). Proponents also assert that the industry has tangible ecological benefits. World fish consumption is increasing every year, and supporters argue that aquaculture reduces pressure on overexploited wild fish stocks (e.g., Dhaliwal 2000). Many opponents, however, see high-intensity aquaculture as an unjustifiable industrialization of nature. First, critics often argue that rearing carnivorous salmon in fact depletes ocean resources, as aquaculture prompts “fishing down the food

web,” where smaller species of fish are harvested in order to provide food meal for the aquaculture industry (cf. Pauly et al. 2000). Opponents have also long complained that salmon aquaculture sites are major polluters through the release of fecal matter and uneaten feed into the marine environment (Ellis 1996). They also frequently point to the problem of escapes. The vast majority of salmon grown in Canada are Atlantic salmon (*Salmo salar*), which are preferred to other species because of their hardiness and faster growth rates. Occasionally, large numbers of these captive fish escape due to human or mechanical error, damage to the nets that contain the fish, or violent weather. This raises a number of concerns on both Atlantic and Pacific coasts. In the Atlantic region, native populations of Atlantic salmon are critically endangered, and there are fears that escaped salmon may compete with fragile wild stocks, or else genetically alter them through interbreeding (ASF n.d.). In the Pacific region, Atlantic salmon are an exotic species, and critics fear that escaped fish may be colonizing Pacific waterways (e.g., Volpe 2001).

Another major environmental issue involves the transfer of diseases and parasites. Salmon farms have very high population densities, which facilitates the transfer of pathogens among captive fish. The real point of contention, however, is whether this has an effect on wild species. A particularly damaging allegation is that aquaculture sites are transferring parasites called sea lice (*Lepeophtheirus salmonis* and *Caligus clemensi*) to migrating wild juvenile salmon (e.g., Morton et al. 2001). The sea louse is a naturally occurring ocean parasite, but multiple lice infections can be fatal to juvenile salmon (the precise mortality rate remains a point of contention). Some critics have blamed sea lice infections for unexpectedly low returns of wild salmon in recent years to some British Columbia rivers (Morton 2004; Krkosek 2005; Krkosek et al. 2006), although industry supporters strongly dispute this conclusion (Brooks 2006; Butterworth et al. 2006).

Human Health

The salmon aquaculture industry promotes its products as being “farmed fresh and healthy” (PAA 2008), and points to multiple studies demonstrating the health benefits of consuming salmon of all kinds (due mostly to high levels of omega-3 and omega-6 fatty acids). Some opposition groups, however, have raised objections about the use of antibiotics, pesticides, and artificial colourants in salmon aquaculture production as both a threat to worker safety and to public health (e.g., DSF 2007). Moreover, a series of studies (some of which were funded by environmentalist organizations) have claimed that farmed salmon contain elevated levels of PCBs, dioxins, and other persistent organic pollutants (POPs) that are transmitted through feed (Easton and Lusniak 2002; Jacobs et al. 2002a and 2002b; Hites et al. 2004). Hites and colleagues’ article “Global Assessment of Organic Contaminants

in Farmed Salmon” appeared in the journal *Science* and was carried by media outlets worldwide in 2004, leading to a significant drop in farmed salmon sales across Europe and North America (Leiss and Nicol 2006). In short, the competing claims regarding the health risks and benefits of aquaculture products put consumers in a difficult position, asking them to weigh one malignancy (cancer) against another (heart disease).

Rights

The aquaculture industry has elbowed its way into Canada’s marine spaces and established islands of private property in the ocean “commons.” There is a longstanding tension in Canada between the drive to centrally administer marine waters in the national interest and the notion that marine resources belong, if they belong to anyone, to coastal users and communities (cf. Matthews 1993; Phyne 1994). Commercial aquaculture treads directly on this sensitivity.

First, shellfish aquaculture takes place almost exclusively in beach and nearshore spaces, leading to conflicts with property owners, traditional users, tourism operators, and some First Nation groups who have rights claims to these areas (Howlett and Rayner 2004). Second, salmon aquaculture in particular raises the spectre of distant powers interfering in coastal culture and livelihoods. The early pioneers of salmon aquaculture in Canada were entrepreneurs who proceeded largely by trial and error, often learning the basics of aquaculture from pamphlets and tacit knowledge derived from enhancement projects or commercial fishing (Keller and Leslie 1996, 13). From the 1980s onward, however, the Canadian salmon aquaculture industry has progressively consolidated and is now dominated by a handful of large firms, most of which are based outside of Canada. Historically speaking, rural communities have reason to be wary of big companies and big industries. One of Canada’s great economic advantages has been its vast and varied resource wealth, which has enabled it to become highly prosperous despite a limited manufacturing and financial base (Innis 1956). Resource exploitation has taken a toll on many communities in the Canadian hinterland, however. The forestry, mining, and energy industries have legacies of carelessly degrading local environments with the full blessing of government. For some, the aquaculture industry looks suspiciously like the latest in a long line of exploiters seeking to profit from permanent damage to local environments and livelihoods.

Finally, aquaculture has landed squarely on the shoulders of the Aboriginal rights movement. Aboriginal rights to marine spaces and resources are hotly contested on both Atlantic and Pacific coasts, and many aquaculture operations are found in spaces that are claimed as traditional territories by one or more Aboriginal groups. Rights over traditional territories are still unclear, although several recent rulings in Canadian courts have confirmed their

legitimacy (Woolford 2005). As we will see in Chapter 2, the issue of Aboriginal rights is rather complex, and is mobilized both in opposition to and in support of aquaculture development. Nevertheless, the Aboriginal rights movement has gained strong political and legal momentum, and has greatly empowered individual First Nations communities where questions of local and regional resource management are concerned.

Rural Development

The final axis of the controversy outlined in Figure 1 involves the question of rural development. Canada's coastal regions have experienced great economic hardship since the early 1990s due to declines in traditional industries such as fisheries and forestry. These changes have profoundly affected social and economic structures in coastal communities. Research by Sinclair and colleagues (1999) in Newfoundland following the closure of the northern cod fishery found deep despondency and social disruption in affected communities. The sudden collapse of the fishery did no less than "wrench away the underpinning of local social structures" by disembedding families from the community practices "that had allowed people to maintain their lives through combinations of personal subsistence labour, paid work, and state aid" (Sinclair et al. 1999, 327). On the Pacific coast, declines in fisheries and forestry have thrown many communities into similar disarray as traditional patterns of work, spending, and social status tied to these industries recede (Young 2006a).

But while traditional industries are down, they are not out. As we will see in Chapter 2, many coastal residents are still deeply committed to traditional activities and industries. Supporters of aquaculture frequently argue that the industry is a much-needed economic bright spot in coastal regions, capable of countering job losses in other sectors (e.g., Shumway et al. 2003; Bastien 2004). Some local critics, however, instead see aquaculture as an unacceptable threat – even a final straw – for already vulnerable commercial and subsistence fisheries. While the causes of the decline of traditional fisheries are complex (including domestic overfishing, habitat destruction from other industries such as forestry, and international jurisdiction disputes on both Atlantic and Pacific coasts), aquaculture has become a key expression point for grievances over the hardships that have resulted from this deep loss. Indeed, we will argue later that aquaculture has come to be for many people a metaphor for the failures of government and industry to preserve coastal resources and ways of life.

The Players

The cast of characters in the aquaculture controversy in Canada is long and varied, and includes governments, activists, scientists, consumers, and local stakeholders. The clearest division among major players in the controversy,

however, is between groups with a mandate to promote and defend the industry and groups that have adopted a clearly oppositional stance. The aquaculture industry in Canada is served by a large number of associations. On the Pacific Coast, major associations include the British Columbia Salmon Farmers Association (BCSFA), the British Columbia Shellfish Growers Association (BCSGA), and the Aboriginal Aquaculture Association (AAA). Industry associations on the Atlantic coast include the New Brunswick Salmon Growers Association (NBSGA), the Newfoundland Aquaculture Industry Association (NAIA), the Newfoundland Salmonid Growers Association (NSGA), the Aquaculture Association of Nova Scotia (AANS), and the Prince Edward Island Aquaculture Alliance (PEIAA). At the national level, the industry is represented by the Canadian Aquaculture Industry Alliance (CAIA), and the Aquaculture Association of Canada (AAC).

These associations have been instrumental in lobbying provincial and federal governments and in serving as public advocates and media voices for the industry (as we will discuss in Chapter 5). CAIA, the BCSFA, and the NBSGA have been the most active public defenders of the industry, often engaging directly in protracted struggles with opposition groups over the production and interpretation of claims about aquaculture. There are also several organizations representing pro-aquaculture stakeholders that have recently entered the fray as defenders of the industry, including Positive Aquaculture Awareness (PAA) and the First Dollar Alliance (FDA).

Opposition groups are equally diverse and involve alliances across local, regional, national, and international scales. Most opposition groups are self-identified as environmentalist nongovernmental organizations (ENGOS). On the Pacific coast, ENGOS active in the aquaculture controversy include the David Suzuki Foundation, the T. Buck Suzuki Foundation, the Georgia Straight Alliance, the Living Oceans Society, the Raincoast Conservation Society, the Friends of Clayoquot Sound, and the Watershed Watch Salmon Society. Each of these groups is a member of the Coastal Alliance for Aquaculture Reform (CAAR), which has served as a collective means of conducting research and communications. CAAR's main campaign, "Farmed and Dangerous," targets salmon aquaculture and has been notably successful in organizing boycott initiatives and other means of pressuring retailers and restaurants to declare themselves "proud to be farmed salmon free." There are significantly fewer groups on the Atlantic coast and they are generally less obstructionist. Perhaps the most active has been the Atlantic Salmon Federation (ASF), which acknowledges that the industry has reduced pressure on endangered wild stocks but at the same time argues that the industry presents significant threats through pollution and escapes (ASF n.d.).

These local and regional groups are the main actors in the Canadian controversy, but they have also been joined by some international ENGO heavyweights. For instance, the US-based Pew Charitable Trusts support

research into the environmental and health effects of aquaculture. The Sierra Club of Canada has taken the government of Nova Scotia to federal court over the expansion of shellfish farming along the province's famed Cabot Trail. Greenpeace Canada has petitioned the Auditor General of Canada to investigate the policies of the federal Department of Fisheries and Oceans (DFO) regarding the use of genetically modified fish in aquaculture. The World Wildlife Fund has a strong international campaign to reform finfish aquaculture and enhance marine protection, and has partnered with the ASF in key research and lobbying activities (cf. Porter 2003).

While ENGOs are often the most visible, other groups are involved in the opposition movement. These include Aboriginal organizations such as the Union of British Columbia Indian Chiefs (UBCIC) and the British Columbia Aboriginal Fisheries Commission (BCAFC). Both organizations use very strong language in their opposition to salmon farming in particular, and the UBCIC has held a zero-tolerance position on salmon aquaculture since 1998 (UBCIC 1998). Some commercial fishers' organizations have also taken strong oppositional stances. The United Fishermen and Allied Workers' Union (UFAWU) in British Columbia has expressed opposition to aquaculture primarily through its affiliation with the ENGO the T. Buck Suzuki Foundation, but the union has also taken a direct stance against the industry, with President John Radosevic being on record saying that "the BC government is willing to sell out ten thousand commercial fishermen and fish plant workers for the sake of a handful of multinational corporations" (Simpson and Beatty 2002). On the Atlantic coast, the powerful Fish, Food and Allied Workers Union (FFAW) has targeted aquaculture as part of a broader campaign against DFO's controversial Atlantic Fisheries Policy Review (AFPR). The AFPR was initiated under the Liberal government of Jean Chrétien in 1999 to reform fishery policy in light of the permanent extension of the moratorium on the commercial northern cod fishery. As such, it has placed a strong emphasis on conservation and diversification of ocean industries, including aquaculture (DFO 2004). The FFAW's particular objection is that "after years of struggle and a commitment to rebuild stocks, fishing people are now being asked to accept new users when they have yet to recover the ground they lost and when stocks have yet to recover anywhere close to levels where it is safe or sustainable to introduce new users" (FFAW 2001).

These are the main players in the aquaculture controversy in Canada. As we will see in Chapter 3, these groups are engaged in intense struggles to sway public opinion. As in many political conflicts, this involves both positive and negative claims making. On the positive side, both pro-aquaculture and opposition groups argue that they are acting in the best interests of the environment and of coastal stakeholders (often to the frustration of actual stakeholders – see Schreiber and Newell 2006a). On the negative side, these groups also engage in significant efforts to discredit their adversaries.

This often involves direct trading of claims and counterclaims that aim to expose opponents' agendas and biases (Hume et al. 2004). These claims often make it into the media, which contributes to the climate of hostility and distrust on all sides of the issue (see Chapter 5). Aquaculture disputes are also clogging the courts on both coasts, with multiple suits pending against government and industry over aquaculture practices and siting (Riley 2003; Sierra Legal Defence 2003; Atkinson 2007). As we will see throughout this book, the battle over the industry's public image takes place on multiple fronts.

A Sociological Analysis of the Aquaculture Controversy

The aim of this book is to advance a sociological analysis of the aquaculture controversy and its broader implications for all kinds of new industrial development. Generally speaking, sociology is the study of patterns in human relationships and other types of formal and informal social organization. This perspective prompts us to look at the aquaculture controversy in a particular way. Aquaculture, and especially salmon aquaculture, is a very science-heavy activity. Natural scientists and engineers in Canada and around the world are making great progress in better understanding and managing the effects of aquaculture on the natural environment. Despite these advances, however, the controversy continues to intensify rather than abate. To paraphrase Ulrich Beck (1992), this is a case where more and more knowledge paradoxically appears to be leading us further and further from consensus. In our view, sociology can make a real contribution by taking a broader view of *how* and *why* the conflict is perpetuated as a political and cultural phenomenon, rather than as a question for the natural sciences alone.

The analysis that we present in this book is based on several years of in-depth research into multiple dimensions of the aquaculture controversy. Our work has involved survey research, field studies, and analysis of public artefacts such as media coverage, interest group publications, and the transcripts of public meetings and hearings on aquaculture.

We conducted four separate survey projects in the course of our research. One was a survey of experts in aquaculture in Canada across all sides of the debate, including experts in academia, government, industry, and environmentalist groups. We also conducted a large survey of aquaculture firms operating in Canada, a smaller survey of aquaculture workers in coastal regions, and a survey of local businesses in one aquaculture-intensive community (Port Hardy, British Columbia). This research gives us a means of analyzing some of the most contentious issues in the aquaculture controversy. Importantly, it also provides an opportunity to hear directly from the people who are involved in aquaculture issues but whose voices are not always discernible in the public clashes between organized pro- and anti-aquaculture groups.

The thesis of this book is that the aquaculture controversy is both unique (reflecting the specific history of coastal and resource development in Canada) and rooted in some of the major unresolved questions about environment, development, rights, and governance confronting democratic societies around the world. This analysis is made in three main parts.

Part 1 (Chapters 1 and 2) develops the argument that the aquaculture industry and controversy in Canada are being shaped by the intersection of multiple economic, political, and cultural developments that are unfolding both in coastal regions and in the broader Canadian and global society. Aquaculture is a young industry, and we suggest that this means two things. On the one hand, aquaculture is being exposed in a formative way to some of the major economic and political forces to emerge in the past two decades. Canada's traditional resource industries, such as forestry, mining, and capture fisheries, have each been fundamentally changed by developments such as economic globalization, the environmental movement, and the Aboriginal rights movement (cf. Wallace 2002; Hayter 2003). The difference with aquaculture, however, is that it is encountering these forces while still in its infancy. On the other hand, we will argue that the late arrival of aquaculture means that the industry has *come to represent these issues* to many stakeholders. In many respects, aquaculture has become a line in the sand for activism *about* globalization, *about* environmentalism, and *about* Aboriginal rights. In a sense, the industry itself has been guilty of inviting these associations. We argue that by claiming that aquaculture can save coastal communities suffering from economic recession and alleviate environmental problems (such as overfishing), the industry itself opened the door for these themes to enter the debate. More seriously, by casting itself as an economic and environmental problem solver, the industry may have married itself *to the problem*. This association with some of the most urgent challenges facing coastal Canada leads us to argue that *aquaculture has become a metaphor for a myriad of hopes and fears facing coastal stakeholders and concerned citizens elsewhere in the country*. This is ultimately a nightmarish scenario for the industry. We argue that although aquaculture is still a relatively minor player in Canada's resource economy, it has become a flashpoint for complicated hopes and fears about past and future. For many of its supporters, the industry is a way forward and a way to salvage a rural coastal way of life. For many critics, it represents the end of these things. It is difficult to find compromise in these visions.

Part 2 (Chapters 3, 4, and 5) examines knowledge and communications conflicts about aquaculture. Both pro- and anti-aquaculture groups are engaged in the production and dissemination of competing claims about the industry. Many of these claims draw heavily on scientific research and, more broadly, the authority that science wields in Western culture as a disinterested and privileged type of knowledge. In Chapter 3, we look at

different ways in which science, narrative (or “framing”), and communications strategies are mobilized by activists on all sides of the debate to try to influence public opinion.

In Chapter 4, we look at data from the survey of aquaculture experts in Canada to examine how individual scientists understand the controversy and their own roles in it. The survey demonstrates clearly that there is no consensus on the effects of aquaculture, but we find that opinions on aquaculture are highly patterned. Experts’ opinions are significantly associated with variables such as institutional affiliation, career history, professional networks, and personal values. This suggests that differences of opinion among scientists run much deeper than simple disagreements over facts and interpretation. Findings from the survey also indicate that the aquaculture controversy is having a corrosive effect on the scientific community working in this field. Science is a cumulative effort that depends on the ability of scientists to trust one another’s findings. Many respondents expressed deep mistrust of the motives and methods of those who disagree with them, and this does not bode well for future consensus or compromise on aquaculture. Last, we look at experts’ views of stakeholders and the general public. Findings are mixed, as we see that experts from all sides of the debate are open to public involvement in aquaculture regulation and decision making but are also critical of the public’s ability to arrive at responsible conclusions about aquaculture.

Chapter 5 examines media coverage of aquaculture in Canada. Both supporters and opponents of aquaculture regularly complain that media coverage is biased against their position. Our study of aquaculture coverage in seven daily newspapers in Canada in fact shows a relative balance in coverage of pro- and anti-aquaculture views. On closer analysis, however, we find that media coverage is highly selective – focusing on particular voices and thematic “packages” that tell particular types of stories about the industry and controversy. Among our most significant findings is that *industry voices* appear most frequently in media coverage (they are quoted more often than any other group), but that *oppositional themes*, particularly regarding environmental risks and harms, are much more common than pro-aquaculture themes. This suggests that while industry voices appear to be dominant, they are often being quoted regarding the problems of aquaculture rather than its benefits.

Part 3 (Chapters 6 and 7) examines the political economy of Canadian aquaculture. Chapter 6 looks at the effects of aquaculture on rural economies. Using our survey of aquaculture firms in Canada, we address the contentious issues of employment and job quality. There are conflicting claims regarding the number of jobs in Canadian aquaculture. Our own estimates based on the survey come in at the lower end of the spectrum (between 5,000 and 6,000 full-time, part-time, and seasonal jobs Canada-wide). We also find

evidence, however, that many aquaculture jobs, particularly in salmon aquaculture, are relatively high paying and stable. This conclusion is bolstered by the (limited) companion survey of aquaculture workers, which finds high levels of job satisfaction among salmon aquaculture employees. Chapter 6 also examines the relationship between aquaculture firms and local economies. Over the past two decades, Canada's coastal communities have suffered substantial economic hardships. Aquaculture promises a way to compensate for declines in traditional resource sectors – a means to re-establish community stability and provide employment for young people who wish to stay or return home. At the same time, critics argue that aquaculture harms existing businesses that are already vulnerable due to the economic downturn (particularly in tourism and other activities that depend on pristine environments). Our research finds strong evidence that aquaculture firms make significant use of local services through direct contracts and other, informal means. Our study of the business community in Port Hardy also finds that few businesses feel that they have been harmed by the aquaculture industry.

Chapter 7 addresses contentious issues surrounding the governance of aquaculture in Canada. Opponents of aquaculture express serious reservations about the dual role that has been adopted by government as both promoter and regulator of the industry, while supporters argue that the industry is in fact over-regulated because of jurisdictional overlaps and political sensitivities. These competing claims restrict the range of options open to policy makers and regulators. We argue, however, that the main challenge facing governments comes from three urgent pressures that are pulling aquaculture policy in opposing directions. The first pressure is economic. The aquaculture industry in Canada is relatively small, and is having a difficult time competing in the international market for aquaculture products (we discuss this in detail in Chapter 1). In this competitive environment, “cumbersome” regulations are seen as a dangerous drag on productivity and flexibility in the global market. The second pressure is environmental. Aquaculture clearly has an environmental footprint that must be regulated by the state. At the same time, government policy makers are not ignorant of the controversy, and develop environmental policy in dialogue with (and as a means of rebutting) oppositional narratives. The third pressure has to do with the legitimacy crisis facing the industry. Governments are keenly aware that aquaculture will not survive without broad stakeholder and public acceptance (DFO [2000] has made “building public confidence in the industry” a policy priority).

In order to deal with this triple pressure, federal and provincial governments have mobilized both traditional and innovative policy responses. On the traditional side, governments have created numerous generous subsidy programs to reduce industry costs and thus enhance competitiveness.

Alongside these, however, governments have also moved (in limited fashion) to implement principles of what has been called “smart regulation,” “results-based regulation,” or “self-regulation,” which put greater onus on the industry to participate in aquaculture policy development and to monitor environmental compliance. While this approach is controversial, it is understood by governments as a means of simultaneously enhancing flexibility and improving environmental performance. At the same time, governments are also engaging in legitimacy-building exercises (with mixed results) that try to include stakeholders and the general public in aquaculture development.

Our concluding chapter argues that the aquaculture controversy in Canada is about more than it seems. Aquaculture has become a make-or-break issue for many interests on all sides of the debate. While the debate itself is often highly technical (about the existence and magnitude of risks, pollution thresholds, ecosystem interactions, and so on), we argue that the controversy endures largely because it has come to mean so many different things to different people. This complexity means that the aquaculture controversy will not be resolved through bullying, shouting, or efforts to simplify the debate. Returning to Leiss’ term (2001), the controversy is similar to an enormous labyrinth, where players hold long-term visions and goals for the future of aquaculture but are forced into immediate actions and reactions that lead in unpredictable directions. In what follows, we attempt to find patterns in the labyrinth – to explore and explain the contours of this stubborn controversy.

Part 1

A High-Speed Collision: Aquaculture as Intersection and Metaphor

Large-scale commercial aquaculture is the first genuinely new resource industry in Canada in a long while. This country has a long history of agriculture, forestry, fisheries, and mining. Even more recent sectors, such as fossil fuel extraction, are often considered offshoots of older, familiar industries such as mining. We will argue that the late emergence of aquaculture is important in several respects for understanding the current controversy. First, the industry's late arrival has meant that public understanding of aquaculture began with a *tabula rasa*. In the early days of the industry, aquaculture was frequently portrayed as an extension of traditional commercial fisheries (Robson 2006, 35). This began to change in the late 1980s with the emergence of new environmental issues – such as pollution and disease incubation – that had not been encountered with traditional fisheries (Keller and Leslie 1996). We argue that because of this novelty, the “blank slate” has ultimately been a significant liability for the industry. As a new activity with unfamiliar methods, aquaculture has been uniquely vulnerable to the efforts of opposition groups to fill in the blanks in public and stakeholder understandings of the industry. Second, the late emergence of aquaculture means that both the industry and opposition movements are being formed in the crucible of major contemporary economic, political, and cultural movements. Whereas traditional resource industries in Canada were shaped by a political economy of centralized authority over resource management, high-volume mass production, and the rigid structuring of access rights to resources, aquaculture has grown up in a very different set of contexts.

In the following two chapters, we will argue that these contexts are both local and global. In Chapter 1, we posit that the aquaculture industry and controversy in Canada are being strongly influenced by global-scale forces such as economic globalization, the rise to dominance of neoliberal perspectives and methods of governance, and the growing influence of the global environmentalist movement. In Chapter 2, we will discuss how the aquaculture industry and controversy are also being shaped by specific local and regional challenges, such as the severe

economic downturn in coastal Canada, as well as the increasing legal, political, and moral weight behind the Aboriginal rights movement in this country.

The primary argument advanced here is that the debate over aquaculture in Canada is about much more than aquaculture alone. In our analysis, aquaculture has become both an *intersection* and a *metaphor*. We suggest that aquaculture is a locus where multiple global and local tensions are meeting and expressing themselves. The aquaculture industry (whether it likes it or not) has become a site where much broader pressures and struggles collide. At the same time, we will argue that aquaculture has come to be a powerful but very flexible and fluid metaphor, particularly in local settings. As a new industry arriving at a time of change, uncertainty, and unease, aquaculture has become a metaphor for both hopes and fears, dreams and nightmares. For some stakeholders, aquaculture has come to represent the best of past, present, and future; for others, it is the worst. As we will see, this fluidity of meaning makes the debate over aquaculture highly complex and deeply emotional.

1

Aquaculture in a Global Context

The aquaculture industry in Canada is emerging at a time when the traditional logics of industrial and resource development are being challenged on multiple fronts. In this chapter, we argue that these challenges stem from important changes in global capitalism, politics, and civil society. While Canada's resource economies have long been dependent on exports and foreign investment, the maturation of a truly global capitalist marketplace is significantly complicating Canada's once-dominant resource and agriculture sectors (Klein and Kerr 1995; Hayter 2003). As we shall see, global capitalism exerts complex pressures on primary economies in this country, sometimes providing impetus to growth and at other times (and places) impetus to restructuring and decline (Young 2008). Moreover, these economic pressures are colliding with the limits to growth imposed by environmental exhaustion. Traditional forestry and fisheries have struggled for several decades with severe problems stemming from environmental degradation (Marchak et al. 1999; Ehrenfeld 2005). In combination, these forces are threatening Canada's longstanding (and perhaps dubious) status as a world leader in high-volume resource production (Burda and Gale 1998; Hayter 2000).

The challenges from politics and civil society are equally complex. Although globalization has made certain corporate actors more powerful and free, other changes may be restricting these freedoms. As we shall see, organized environmentalism has become a momentous global force. More generally, over the past several decades, the notions of stakeholder and consumer rights have gained real legal and moral traction in democratic societies. For a long time, government and industry could count on their combined weight to push through controversial projects or actions. Although this is still true, businesses are now more vulnerable to citizen protest than in the past (Fischhoff 1995). This is due in part to new legal obligations, such as the requirement (following the 1997 *Delgamuukw* decision of the Supreme Court of

Canada¹) that firms and governments consult with Aboriginal stakeholders before proceeding with projects that may encroach on group rights. But it is also due to cultural shifts in the relationship between businesses and the general public, which has become much less tolerant of corporate malfeasance. The business management literature now recognizes many cases, including British Columbia's "war in the woods" and the European Union's restrictions on genetically modified foods, where large companies have been broken by their failure to recognize the power of citizen movements to paralyze production and/or throw up impassable political roadblocks (Magnusson and Shaw 2002; Leiss 2001).

Even as the economic and cultural rules of the industrial game are changing, so too are government involvement and oversight of resource development. Federal and provincial governments in Canada have traditionally seen resource development as an opportunity for nation and province building (Matthews 1983). Older models that coupled resource development with welfare-state programs, high employment, and centralized regulatory regimes no longer anchor government approaches to resource development, however. In place of these older strategies, governments are now turning to more flexible, nimble, and "smart" forms of resource policy, both in the name of allowing greater efficiencies in resource production and in the name of improving environmental compliance (Young and Matthews 2007b).

All of these changes are controversial in their own right, and are contested at global, national, and local scales. Moreover, although these trends are concurrent and linked in many respects, they are also often contradictory. In this chapter and the next, we argue that the aquaculture industry is caught in the intersections of these forces – pressured by the logic of global capitalism to expand and grow, to pursue efficiencies, and to take risks, and pressured by stakeholders, consumers, and activists to constantly justify its methods, products, and rights to marine spaces.

Globalization and Natural Resources

Social scientists are divided about what is actually new about economic globalization. Some point out that international trade and interdependency have been a reality since at least the nineteenth century (e.g., Hirst and Thompson 1996), while others argue that current economic globalization is fundamentally rewriting the economic and political rules of the game (e.g., Castells 2000; Urry 2007). We argue that current economic globalization is having a demonstrable impact on Canadian aquaculture in two ways. First, the aquaculture industry in Canada is subject to the pressures of increasingly globalized markets (particularly in terms of cost and price). Canadian-based aquaculture producers hold a small share of the global market, which makes them rather vulnerable to competition and price fluctuations. Second, globalization has prompted deep changes in traditional

resource industries such as commercial fisheries and forestry. These changes have led to severe reductions in employment and investment in coastal Canada. Aquaculture has emerged in the midst of these changes – which has been both good and bad for the industry. As we will discuss later in this chapter, at times the aquaculture industry has actively promoted itself as a saviour for communities and workers who have fallen victim to declines in traditional industries. Sometimes, however, the global character of the industry is a liability in the eyes of local people seeking to avoid the mistakes of the past.

Resource industries and economies have long been international in orientation. Indeed, much of the early scholarly work on the logic and structure of global economies was based on studies of resource industries. For instance, the theory of comparative advantage developed by classical political economists such as David Ricardo advocated freer international trade so that nations could concentrate on producing certain goods that reflected environmental and/or labour advantages, while importing goods that were more advantageously produced in other nations (cf. Ricardo 1969 [1817]). This became the accepted wisdom of the nineteenth century, and colonial territories and rural areas were encouraged to develop industries based on resource wealth (cf. Goldin 1990). The link between international resource economies and local development has been particularly important for Canada, as both a former British colony and neighbour to the world's most industrialized nation. Indeed, it was the Canadian economic historian Harold Innis who developed a strong counterpoint to theories of comparative advantage in his "staples thesis" (Innis 1933).

The staples thesis is both an economic and an institutional theory. It accepts the main argument of the theory of comparative advantage (that regions will specialize in any geographically substantial commercial space), but it argues that this is not always to the advantage of peripheral regions. In an environment where investors are free to move their capital where it is best suited, investment in peripheries will target development of single activities and industry to feed better-established manufacturing and service centres located elsewhere (Marchak 1983, 23). In other words, this investment makes strong demands on local institutions (shaping labour markets, local economies, and even local governments) without committing in any way to local diversification or long-term development. Thus, the staples perspective introduced an important power dimension to understandings of international trade and movement in commodities, suggesting that peripheral regions are actively shaped by the market demands and political influence of the centre. Among the key observations of staples theory is that peripheral resource regions bear many of the economic and environmental risks necessary for the stability of central economies (Marchak 1983, 23). While the theory of comparative advantage implies that resource regions

ought to be capable of leveraging their natural wealth towards long-term development, the staples perspective emphasizes the vulnerability of peripheries to dependency on forces well beyond local control.

Given that Canada's resource industries have long been oriented towards export and international markets, it is important to return to the question of what is new for resource peripheries in the current round of economic globalization. For instance, some scholars continue to place staples theory at the centre of their analyses of restructuring in Canada's resource sectors (e.g., Markey et al. 2005), which suggests a degree of continuity with prior experiences. At the same time, however, other social scientists argue that resource industries and regions are being fundamentally reshaped in this latest round of economic globalization (e.g., Hayter 2003; Young 2006a).

Research suggests that both are probably correct. Taking the broad view, what is new about the current experience of globalization is its completeness. For the first time in human history, we can talk about truly global capitalist markets for commodities and resource products. To be clear, borders and distance are not going away. For evidence of this, we need only look to Canada's trade relationship with the United States (a country that received 77 percent of Canadian forest products exports in 2002, at the height of the bitter softwood lumber trade dispute). Expanding economic globalization has opened the door, however, for new producing regions to challenge Canada's traditional dominance in resource exports. Compounding this change is the fact that Canadian resource sectors have traditionally focused on high-volume, low-value production. Scholars have argued that Canada's vast wealth of resources, coupled with a dependency on export to world centres, has led the nation into a "staples trap," where high-volume production has trumped the development of secondary manufacturing and research and development (cf. Marchak 1983). Until the current round of economic globalization, Canadian resource industries relied on volumes to influence pricing. This influence becomes tenuous in an accelerating global economy, and Canada's resource economies are increasingly being undercut in the low-value market they once dominated – trapped between high labour costs, environmental limitations, and a paucity of secondary or value-added manufacturing capacities (Burda and Gale 1998; Howlett and Brownsey 2008).

Thus, economic globalization is accelerating challenges and trends that have been evident for some time, but in a way that is leading to significant disjunctures in rural and resource economies in Canada. To date, this has been most evident in forestry and fisheries, and we will briefly consider recent changes to these sectors because of important parallels to developments in Canadian aquaculture.

Forestry arguably represents the archetypal staples industry, as forest products are essential for industrial development of core regions (everything from housing to newsprint) while forest extraction activities often come to

dominate peripheral communities located near the resource (Marchak 1983). This also means that forestry has been shaped by the demands of faraway markets. In particular, Canadian forestry has long depended on export to the United States (notwithstanding cyclical trade disputes), and this dependency has only increased following the Canada-US Free Trade Agreement and the North American Free Trade Agreement (NAFTA). For instance, in 1962, 74 percent of Canadian exports of forest products went to the United States; in 2005, the figure stood at 81 percent (Hayter 2000; Statistics Canada 2006). While exports to Europe and Japan have fluctuated over time (exports to Japan reached as high as 19 percent of total exports in 1987), in 2005 they constituted 6 percent and 4 percent of total exports, respectively.

Paradoxically, then, for Canadian forestry globalization has meant a closer attachment to the United States. At the same time, however, trade liberalization has encouraged new *producing* regions to enter the global marketplace and effectively compete with Canadian industry. Burda and Gale (1998) point to South America as the primary threat to Canadian dominance of the US market, particularly as transport and tariff barriers are removed. Canada's position is also being weakened by changes to forest management practices in other parts of the world. Specifically, "plantation forestry" is becoming increasingly common in warmer climates, including southeastern regions of the United States (Sedjo 1999; Smith et al. 2001). Plantation forests are intensively managed and highly productive tree farms that are modelled on agricultural principles; they now account for nearly one-third of global forest harvest (Bael and Sedjo 2006).

The entry of new producers has driven forestry exports to new heights worldwide, nearly doubling from 1985 to 2005 (FAO 2007a). At the same time, however, Canada's share of world forestry exports has fallen from 23 percent in 1984 to 16 percent in 2005. This presents Canadian producers with an escalating problem: as producers lose market share, they further lose the ability to influence pricing, a situation that places Canada's traditional high-volume, low-cost forest sector in a very precarious and volatile position (Burda and Gale 1998). Economic globalization is not radically changing the industry in Canada: this country still overwhelmingly exports minimally processed, standardized forest products. Globalization accelerates competition, however, and paradoxically makes Canada increasingly dependent on the US because that is where Canadian producers are best able to compete in an increasingly difficult global market (Hayter 2000, 233).

The globalization of world fisheries has also caused a relative decline in Canada's world presence. In the 1950s, Canada generated 5 percent of the world's seafood production. By 2000, however, this had fallen to less than 1 percent (FAO 2007b). This relative decline masks real growth: from 1950 to 2004, Canada's fish production increased 140 percent from all sources (fisheries and aquaculture), while world fish production rose an astounding

785 percent. Nevertheless, Canada's declining share of world fish production means that Canadian producers are again losing competitive advantage and the ability to influence pricing. Somewhat ironically, this loss of influence is one of the reasons often given by government officials to justify aquaculture expansion (e.g., Bastien 2004, 8), particularly since Canada's two most lucrative fisheries – Atlantic cod and Pacific salmon – have become shadows of their former selves. The well-documented collapse of the North Atlantic cod fishery has cost Canada its dominance of an important world fish market, and Canadian grocers now import cod from countries such as Norway, Russia, and Iceland (OECD 2003, 47). On the Pacific coast, the salmon fishery has been severely affected by conservation efforts. In the mid-1980s, Pacific fisheries typically yielded 80,000 to 100,000 tonnes annually (yearly totals would fluctuate because salmon populations are cyclical). From 1998 to 2006, however, annual catch has averaged only 26,500 tonnes (DFO 2007). At the same time, salmon fishers have seen a significant decline in prices that is directly attributable to the worldwide growth of salmon aquaculture (as we will discuss later). Overall, Canadian exports of wild-capture salmon declined 57 percent from 1988 to 2001 (BC Salmon Marketing Council 2001).

The Canadian aquaculture industry faces many of the same challenges as forestry and fisheries. Overall, world markets for commodities and food products have become increasingly complex and competitive (Bonnen 2000). This global reality has had a formative impact on industrial aquaculture. While most of the world's aquaculture products are marketed locally (particularly freshwater species), "luxury" agri-food products such as aquacultured salmon and shellfish are global commodities. Since the late 1980s, these markets have exhibited significant volatility, with world salmon production in particular growing exponentially while average prices dropped from US\$6.10 per kilogram in 1988 to US\$3.20 per kilogram in 2004 (without discounting inflation; FAO 2004, 50).² These declines in prices can be clearly attributed to the expansion of salmon aquaculture in traditional regions such as Norway and the United Kingdom, as well as the entry of new producers such as Canada and Chile. There are distinct parallels with forestry in this regard (see above), as the entry of new producing countries has caused the export value of aquacultured salmon from Norway (the traditional world leader) to fall nearly 75 percent from 1985 to 2004 (Knapp et al. 2007, 69).

The impact of this price drop has been unevenly distributed. Indisputably, the primary victims have been commercial fishers. In traditional salmon markets, poor harvest years have often meant higher salmon prices, a situation that partially compensated for this misfortune. The current dominance of aquaculture in world salmon markets means, however, that commercial fisheries have less influence over pricing, making them more vulnerable to price fluctuation (cf. Knapp et al. 2007, 215). This has led to significant

conflicts between commercial fishers and the aquaculture industry in Canada, particularly in British Columbia. The price drop in world salmon markets has also affected aquaculture producing regions differently. For instance, operations in Norway have been able to reduce their costs of production sufficiently to stabilize and even increase profit margins despite the price decline, largely through a very strong research and development program (Knapp et al. 2007, 69). By comparison, Chile has become the second-largest producer of farmed salmon (behind Norway) on the strength of low costs for labour, feed, and environmental compliance. Such advantages have permitted Chilean producers to increase salmon production by an average of 42 percent annually since 1984 (Knapp et al. 2007, 66).

Canadian aquaculture producers thus face a difficult global market. Despite significant growth in the Canadian aquaculture sector (at an average annual rate of roughly 9 percent since the early 1970s), Canadian producers have trouble competing with low-cost producers. For instance, in 2005, Chilean producers were able to offer prices for fresh and frozen salmon fillet products at an average of US\$2.20 per kilogram lower than Canadian producers (CAIA 2005a). This market reality has in part motivated investments by federal and provincial governments in aquaculture research and development in an attempt to make Canada a leader in aquaculture innovation and thus take the high road of value-added research and production into global markets rather than the low road of reliance on cost advantage (see Chapter 7). Arguably, the biggest threat to the Canadian aquaculture industry is that it will be caught between the two models represented by Norway and Chile.

The world market for aquacultured salmon is dominated by a small number of multinational firms that locate production in multiple regions of the world (Phyne and Mansilla 2003). At the turn of the millennium, world salmon production was dominated by a half-dozen multinational companies. A recent round of mergers and acquisitions has reduced this number to two firms headquartered in Norway: Pan Fish (which acquired rival giants Marine Harvest and Fjord Seafoods in 2006), and Cermaq (which acquired George Weston Ltd.'s Pacific Canadian aquaculture operations in 2005). Both firms now have extensive holdings across the major salmon-producing regions of Norway, the United Kingdom, Canada, and Chile. This means that major salmon aquaculture firms are able to draw value out of both the high and low roads to world markets. The role of Canada as a producing region is unclear in this regard. While Canadian shorelines are well suited for aquaculture production, resistance to the industry has hindered growth. At the same time, Chile has been successful in parlaying low-cost advantages into dramatic increases in production as well as a dominant position in value-added processing. Low labour costs in particular have enabled major firms to expand processing operations in Chile, to the point that Chilean production dominates the import market for fresh and frozen salmon fillets

in the United States, and is growing exponentially in market share for canned salmon (Knapp et al. 2007, 141). Canadian producers are generally unable to compete in these sectors, and are concentrating primarily on the minimally processed fresh market in Canada and the United States (CAIA 2005a).

Caught between high and low roads, the Canadian aquaculture industry has followed the path of so many prior resource sectors and become strongly dependent on export to the United States. As of 2005, Canada was the fourth-largest producer of aquacultured salmon (behind Norway, Chile, and the United Kingdom), and the United States received 93 percent of Canadian exports (CAIA 2005a). Clearly, the American import market, valued at US\$1.2 billion, is crucial for the survival of the Canadian salmon aquaculture industry. Aquaculture differs in a key respect from traditional resource sectors such as forestry, however, in that Canada is a relatively small player in the American salmon market. Chile is by far the largest player in US imports, holding a 60 percent share of the US market in 2004 (CAIA 2005a). In 2006, Chilean producers moved an estimated 72,000 tonnes of fresh salmon to the United States, compared with an estimated 7,000 tonnes from Canadian producers (*Fish Farmer* 2006). Moreover, recent fluctuations in currency have cost Canadian aquaculturists one of their key competitive advantages. Throughout the 1990s and into the new millennium, Canadian producers benefited from a weak Canadian currency (valued at between 60 and 70 cents to one US dollar). This magnified profits while enabling Canadian firms to remain marginally cost-competitive in the United States (PWC 2003). By late 2007, however, the Canadian dollar had climbed to par with the US dollar, thus increasing cost/price pressures on Canadian producers.

This strong but precarious dependency on a single export market raises legitimate fears that Canada's aquaculture sector is replicating the "staples trap" that has characterized traditional Canadian resource development, where the industry focuses on a single product and market and fails to invest in the diversification necessary for long-term resiliency (Watkins 1982). These questions are compounded by the fact that Canadian producers have only a minor presence in the US salmon market, and therefore have very little influence over pricing. So although there are important parallels with traditional sectors such as forestry, a crucial difference is that the Canadian aquaculture industry has emerged in an era of more complete globalization, where Third World producers are able to leverage low-cost advantages into significant market share. Perhaps the clearest indication of Canada's small stature in US salmon import markets is the fact that Chilean producers have been the target of protectionist lobbies in the United States since 1997. In a move that eerily parallels the Canada-US softwood lumber dispute (a US import market in which Canada is the major player), a group called the US Coalition for Fair Atlantic Salmon Trade filed a petition with the Department

of Commerce in 1997, accusing Chilean producers of dumping low-cost salmon on the US market as well as fixing prices below the costs of production (Knapp et al. 2007, 244).

In summary, globalization both defines and challenges the Canadian aquaculture industry. Some of these challenges parallel those facing Canada's traditional resource sectors, and some stem directly from the late emergence of the industry in a context of intense global competition (meaning that it has never been a major player in world export markets). Canada's strong reliance on minimally processed exports to a single market suggests that Canada's aquaculture sector is significantly more vulnerable to market and currency swings than other producing regions in either the First or Third Worlds, which are better able to influence pricing and are more invested in value-added activities. Indeed, in recent years Canada's aquaculture industry has shown troubling signs of year-to-year boom-and-bust swings based largely on short-term trends in pricing and consumer demand (CAIA 2005a; Harvey 2006, 11). Globalization means that the industry has exhibited both significant growth and deep vulnerabilities, and its economic future is uncertain. The Canadian aquaculture industry has weathered intense controversy over the past decade and a half, but questions about its long-term economic viability remain, particularly as competing regions continue to expand aggressively. Thus, the stakes are high in the ongoing political debates over the fate of the aquaculture industry in Canada.

Neoliberal Governance and Development

Just as the Canadian aquaculture industry (and controversy) is being shaped in the crucible of economic globalization, it is also entangled in significant changes to how rural and resource economies are governed and regulated. Broadly speaking, these changes are part of a global (but highly varied) movement in political philosophy and policy away from what is often termed "Fordist-Keynesian" strategies for economic development and regulation, and towards neoliberal strategies for achieving these (we will explain these terms in a moment). Aquaculture is the first major resource industry in Canada to grow up in the context of neoliberal ideologies and policy regimes. As we shall see, other major sectors, such as forestry, were formed under very different economic and environmental regimes, and are also currently undergoing controversial transitions away from Fordist-Keynesian practices and towards neoliberal forms.

Neoliberalism is the major political economic orthodoxy in the world today (Peck and Tickell 1995, 2002). It is both a worldview and a specific way of organizing governance and policy (Jessop 2002a). Neoliberalism is simultaneously a universalist doctrine, with academic and political adherents who believe that it can be applied nearly anywhere to any set of policy problems, and a flexible doctrine that is applied very differently around the

world (Larner 2003). Above all, neoliberalism is the political and regulatory foundation of economic globalization. Like the term “globalization,” however, “neoliberalism” is a slippery concept that is sometimes used carelessly or haphazardly. Some academic critics have questioned the utility of the term, particularly if it is used only as a shorthand for any and all government and corporate actions that are not identifiable as progressive or leftist (see Barnett 2005; Castree 2006). On the other hand, some scholars argue that the concept of neoliberalism offers one of the most useful tools for understanding contemporary governance – going even so far as to say that “neoliberalism appears to have usurped globalization as *the* explanatory term for contemporary forms of economic restructuring” (Larner 2003, 509). Adherents of the latter position have worked to build a theoretical basis for understanding neoliberalism both as a precise set of ideological principles and as a worldwide political movement that is flexible and adaptive to different circumstances – equally but differently applicable to the agricultural economies of Latin America and the urban cores of Europe and North America (e.g., Perreault and Martin 2005; Brenner and Theodore 2005).

Although formal definitions of neoliberalism vary, in our view the conceptualization of neoliberalism from the perspective of regulation theory is the most promising for understanding both the precision and flexibility of this movement (Young and Matthews 2007b). Regulation theory draws on the iconic thinking of Karl Marx, Antonio Gramsci, and Nicos Poulantzas, each of whom sought to understand the relationships between capitalist economies, governments, and societies. For each thinker, one of the most profound puzzles of the modern world is the endurance of capitalist economies in the face their own contradictions (Jessop 2002a, 6). These contradictions are economic (in the tendency of capitalist markets to boom and bust, to concentrate capital and wealth, and to institutionalize inequality and unemployment) and political (in that the real winners in capitalist economies are few in numbers but very politically powerful). The puzzle, then, involves inquiring into the source of capitalism’s resiliency; in other words, how has capitalism survived its economic and political tendencies, and how has an inherently volatile and unequal system won the consent of those who are (ostensibly) its victims? These are big questions, and Marx, Gramsci, and Poulantzas each wrote voluminously on the subject (e.g., Marx 1985 [1848]; Gramsci 1992 [1935]; Poulantzas 1971). Again, while specific interpretations vary, the core point that has been carried from these classic authors into contemporary regulation theory is that capitalism operates through the marriage of *methods of accumulation* and *methods of social regulation*. In other words, regulation theory proposes that one of the key roles of government in a capitalist economy is to negotiate the relationship between economic and social policies in the interests of stabilizing the predominant macroeconomic system of the day.

To illustrate, we draw on the work of Jessop (2002a, 2002b, 2004), a leading figure in the regulationist school. Jessop argues that there are identifiable eras in the history of capitalism where governments have sought different “fixes” for the contradictions of capitalist markets and practices. Simply put, as capitalism evolves, so do the ways in which governments regulate and support it. In this light, any argument that capitalism is changing (an argument that is front and centre in the current literature on globalization) prompts us to look closely at state activities. Indeed, Jessop’s main concern is with understanding the current period as one of transition between two eras in the history of world capitalism. According to Jessop, the mode of regulation that is currently receding is that of the Fordist-Keynesian state, or the “model of the postwar state in the United States, Canada, Northwestern Europe, Australia, and New Zealand” (Jessop 2002a, 55).³

Taking a step back, Fordism is essentially a method of production that is based on the mass production of standardized products (the term being directly derived from the Ford Motor Company’s pioneering of assembly line production) that are typically destined for national or continental markets. The imprint of Fordism lies strongly on the Canadian economy, it being the anchor for postwar development of the country’s manufacturing economy (particularly in the automobile sector and in textiles) as well as resource economies (cf. Hayter and Barnes 1997; Wallace 2002). Keynesianism generally refers to the dominant method of government participation in national and regional economies during the Fordist era. Named for the British economist John Maynard Keynes, Keynesianism refers to the idea that governments ought to play a strong role in stabilizing the economy by supporting consumption activities (Johnson 1971). Thus, a Fordist-Keynesian economy

can briefly be defined as an accumulation regime based on a virtuous auto-centric circle of mass production and mass consumption secured through a distinctive mode of regulation expressed in a [Keynesian] state ... In this form, the state contributes to the delicate balance of production and consumption by helping to integrate the circuits of the capital and consumer goods industries by managing the conflicts between capital and labour over both the individual and the social wage so that the virtuous circle of Fordist growth can be maintained. (Jessop 2002a, 55, 57)

Figure 1.1 provides a general summary of the strategies employed by states in the Fordist-Keynesian era in their attempts to stabilize Fordist capitalism. These attempts involved significant government activism, particularly in ensuring growth in both supply and demand. This arrangement anchored the “long boom” experienced by Fordist-Keynesian nations from the postwar period until the mid to late 1970s. The crisis in Fordist-Keynesian economies

that emerged in the 1970s and 1980s has been the subject of lengthy academic debate (e.g., Lipietz 1987; Lash and Urry 1987; Teeple 1995; Brenner 2004). While opinions vary, this literature argues that the marriage of mass production and consumption *within* national economies became increasingly untenable with time and growth (leading to inflation and recession), and increasingly fragile in the face of shocks such as the 1973-74 oil crisis (cf. Brenner 2004).

The Fordist-Keynesian economy and state did not collapse quickly, nor have they receded completely. Nevertheless, the crisis in Fordist-Keynesian arrangements has prompted an extensive and broadly based set of economic reforms across both advanced capitalist and developing countries towards neoliberal policies for economic and social governance. These reforms were initially led by true believers in state retrenchment and deregulation, such as Prime Minister Margaret Thatcher, President Ronald Reagan, and (to a lesser extent) Prime Minister Brian Mulroney, during the late 1970s and 1980s, but in recent years the movement to neoliberalism has been joined by governments of centrist and even leftist leanings. Indeed, Brenner and Theodore (2002) argue that every major government in the advanced capitalist world has now embraced neoliberalism as a guiding economic philosophy.

Neoliberalism is a highly varied movement, but its fundamental principles can be summarized as shown also in Figure 1.1. To understand this summary, it is important to recall that neoliberalism is a political response to the transition from a regime of accumulation based largely on Fordist production within national boundaries to a regime that is linked closely with economic globalization and its imperatives for internationally organized production and consumption. If the aim of state intervention under Fordist-Keynesianism was to stabilize and balance production and consumption within nations, the aim of neoliberal state strategies is to promote flexibility and competitiveness in a wider economic environment (Jessop 2002a; Brenner 2004). Thus, as outlined in Figure 1.1, a significant component of neoliberal policy is to encourage innovation and extend corporate rights while permitting downward pressure on wages (in some sectors and occupations) and the subordination of social policy to economic policy.

In addition, neoliberal governance encompasses a very different approach to economic development than in Fordist-Keynesian regimes. Brenner (2004, 134) argues that in the Fordist-Keynesian era, economic development was equated with the drive “to maximize national output and income by promoting a balanced spatial distribution of socio-economic capacities and infrastructural investments across the entire national territory.” In other words, if Fordist-Keynesian economies were based on the mutual development of production and consumption capacities, then “significant large-scale territorial disparities were viewed as a major threat to stabilized patterns

Figure 1.1

Fordist-Keynesian and neoliberal states

Characteristic	Fordist-Keynesian state	Neoliberal state
Distinctive set of economic policies	Full employment; demand management; provision of infrastructure to support mass production and consumption	Focuses on innovation and competitiveness in open economies
Distinctive set of social policies	Collective bargaining; generalization of mass consumption; expansion of welfare rights	Subordinates social policy to an expanded notion of economic policy; downward pressure on the “social wage”
Primary space or scale	Relative primacy of national scale in economic and social policy making, with local as well as central delivery of service	Multiplication of scales above and below the national scale, but national states continue to have a strong regulatory role
Primary means to compensate for market failure	Market and state form a “mixed” economy; the state is expected to compensate for market failures	Increased role of self-organizing governance to correct for both market and state failures

Source: Adapted from Jessop 2002a, 59, 252.

of macroeconomic growth” (Brenner 2004, 130). Territorial inequalities were indeed a substantial preoccupation of Canadian governments during the postwar period. At the federal level, this concern led to the creation of massive regional development programs in the 1960s and 1970s, such as the Department of Regional Economic Expansion (cf. Savoie 1992). Many provinces also invested in this ideal in their attempts to spread Fordist-Keynesian institutions across rural and remote regions (we will consider this below).

With economic globalization, the need to promote geographically even or universal development in order to “maintain the virtuous circle of Fordist growth” recedes (Jessop 2002a, 57). Brenner (2003) argues that globalization shifts the axis of economic development policy away from horizontal concerns (geographic uniformity or equity) and towards vertical or scalar concerns (the links between particular localities and global markets and flows). Thus, neoliberal economic development policies explicitly aim to foster *direct linkages* between local and global as the engine for national economic

growth: “[Against] the project of equalizing the distribution of industry, population and infrastructure across national territories, [neoliberal] states strive to differentiate national political-economic space through a reconcentration of economic capacities into strategic urban and regional growth centres” (Brenner 2003, 206).

In the Fordist-Keynesian era, governments asserted their vision of economic development by centralizing authority over industrial development, expanding the institutions of the welfare state, and playing an active role in addressing market failure and gaps through institutions such as Crown corporations (see Figure 1.1). Neoliberal governance uses a very different set of tools for promoting “glocal” or geographically variable development. In general, these tools involve the *selective devolution* or partial transfer of authority and/or responsibility to private actors (corporations, groups, or individuals) (Jessop 2002b, 454). Devolution is a complex policy tool. In some cases, it can be described using the familiar concepts of privatization, deregulation, and liberalization. At other times, devolution is more controlled or highly selective, where governments transfer authority in a context that encourages private actors to “act rightly” or to exercise their new freedoms in a manner that reflects the goals of “post-welfare” governance (such as self-sufficiency, self-discipline, and efficiency; cf. Herbert-Cheshire and Higgins 2004).

This shift in development strategies has been well studied in urban settings (Harvey 1989; Graham and Marvin 2001; Jessop 2002b; Brenner and Theodore 2005), but it also has strong implications for rural and resource regions. First, it has meant that federal and provincial governments in Canada have much less interest in making investments in rural regions for the sake of addressing regional inequalities. Across the country, rural services are being reduced, particularly social and welfare services, as well as centres of administration such as management offices for forestry, agriculture, and parks (Epp and Whitson 2001; Halseth and Halseth 2004; Young 2008). Second, the shift to neoliberal development strategies in Canada has meant a significant devolution of authority to resource firms with respect to discretion over economic geographies, environment, and labour relations (Young and Matthews 2007b; Young 2008). In the Fordist-Keynesian era, federal and provincial governments pursued rural and resource development agendas based on efforts to foster large-scale production that was as geographically dispersed as possible. This “geography of Fordism” was built through direct government investment in infrastructure and community building, as well as the imposition of conditions on rights to publicly held resources that required major resource firms to process core commodities (particularly wood and fish) in designated facilities and/or regions with the aim of stabilizing rural economies (cf. Hayter 2000; Young 2008). These strategies were often

explicitly mobilized with the deeply Fordist-Keynesian intent of province building, where vibrant resource exploitation dispersed across the territories and communities of the province was understood as a key anchor in the “virtuous circle” of production and consumption capacities and therefore of overall prosperity and development (cf. Barman 1996; Sandberg and Clancy 2000).

With economic globalization and the crisis in Fordist-Keynesian economies, governments have moved to permit greater flexibility in resource production. For example, in British Columbia’s major resource sectors, this has included policy reforms such as the elimination of spatial restrictions on processing (i.e., the conditions that linked processing with the region of harvest) as well as more flexible environmental regulation (Young and Matthews 2007b). Similar reforms are being considered in Quebec and Ontario, both of which have suffered severe downturns in their forest sectors (Dutrisac 2008). Reforms such as these represent a final rejection of the Fordist aim of reducing territorial disparities as the primary objective of development policy. This is made clear in the following statement from the government of British Columbia regarding the logic behind the elimination of spatial restrictions on processing in forestry:

Timber processing [restrictions] were introduced in an attempt to create local or regional economic benefits from the timber that was [locally] logged. But these regulations led to a series of unintended consequences that hinder the forest sector’s ability to make sound, business-based decisions ... Forcing licensees to process wood at mills with equipment that is outdated, or at mills that make products that are not in demand, prevents valuable public timber from flowing to other, better uses ... Some British Columbians view these policies as part of the social contract that forest companies should meet in exchange for the right to log public land. But while these policies may have made sense in a different time with different market conditions, they have not shielded today’s communities from job loss and economic difficulties. In fact, they serve as a disincentive and impediment for the forest industry. (British Columbia 2003a, 17)

In ending geographical restrictions on processing, governments are essentially granting licence for investment and jobs to pool in regions and communities that are best positioned to compete at a global level. Thus, as in urban areas, the ideal of universal development is giving way to one where the concentration of investment in particular localities is considered essential and desirable. What this means, however, is that areas that are not seen to be ideally positioned for global competition in resource sectors are increasingly vulnerable to further decline. Indeed, current research suggests

that *coastal regions* are being particularly impacted by these changes in policy as the geography of fish and forestry processing shifts away from smaller communities (Young 2008).

Neoliberal strategies for economic development also envision a new role for local communities. In the Fordist-Keynesian era, control over local development was in fact highly centralized in the hands of senior governments and major employers (Matthews 1983). Local governments were not typically involved in questions of economic development, and generally focused on service delivery and administration (Hayter 2000, 288). Neoliberal strategies break from this tradition. First, as we have discussed, devolution to corporate actors is freeing them from traditional obligations to resource communities, thus destabilizing the traditional system for local development. Second, in recent years both federal and provincial governments have created new rural development programs that encourage entrepreneurialism among local governments, groups, and firms. These programs – which include the Community Futures network (Community Futures Development Corporations in Western Canada and Ontario, les sociétés d'aide au collectivités au Québec, and Community Business Development Corporations in Atlantic Canada), various programs of Western Economic Diversification (WED) and the Atlantic Opportunities Agency (AOA), as well as various provincial programs such as Community Forestry – provide a means for local actors to pursue from-the-ground-up initiatives for local development. Importantly, this strategy for local development reflects *both* social democratic and neoliberal ideologies (McCarthy 2005; Young 2008). On the one hand, the move to support ground-up development is a significant step towards community empowerment and local control over directions for development. On the other hand, this strategy meets the neoliberal goal of replacing the paternalism of universal programs with locally driven initiatives that are often led by champion groups and evaluated through competitive review, making the expenditure of public funds for development much more targeted and efficient (Graham and Marvin 2001, 309). Moreover, this development strategy encourages localities to pursue particular advantages that, as Brenner (2003, 2004) argues, are thought in the neoliberal discourse to be the cornerstone for success in the global economy.

Thus, in rural and resource economies, the neoliberal approach to economic development involves two main movements: the (further) empowerment of major corporate actors and the (modest) empowerment of local actors to pursue local development goals (Young 2007).⁴

We argue that state approaches to aquaculture in Canada involve both types of devolution. Federal and provincial governments in Canada have sought to selectively devolve key aspects of industrial development to aquaculture firms and to communities. To be clear, aquaculture remains a highly regulated industry, particularly with respect to salmon and other finfish.

The nature of these regulations and their enforcement appears to be moving, however, in the direction of what is termed “results-based regulation” or “performance-based regulation” (Howlett and Rayner 2004). Proponents of results-based regulation argue that government regulations ought to focus on establishing standards and thresholds for end-of-pipe outcomes rather than engaging in “prescriptive” or “process-based” regulations that seek to govern the private sector by monitoring its activities step by step (cf. Coglianesi 2003). This approach is based on two assumptions. The first assumption is that the private sector is inherently innovative, and if unshackled from prescriptive regulations, it will find efficiencies along the way to meeting good, scientifically determined end results (Vold 2003). The second assumption is that firms operating in a global economy require the flexibility to bend the rules at times, so long as things are set right in the final assessment (West Coast Environmental Law 2002). Of all jurisdictions, British Columbia has been the most aggressive in drafting and implementing results-based regulations for aquaculture (British Columbia 2006b). We will return to this question in Chapter 7, but for the present discussion it is important to note that this shift in regulatory approach grants significant authority and flexibility to corporate actors to manipulate the details of production and environment, and that state authorities deem this flexibility to be crucial to the ability of Canadian aquaculture operations to compete with low-cost producers in a global market (Canada 2006).

Governments are also moving to involve communities in small-scale aquaculture at the same time that they strengthen corporate power and authority over large-scale operations. For instance, in a distinct parallel to community forestry programs, the government of British Columbia has developed a program called the Shellfish Development Initiative, which “works with coastal and First Nations communities” in providing knowledge and logistical support for locally driven shellfish aquaculture (British Columbia 2007a). The federal government has also been active in supporting the development of local and community-driven shellfish aquaculture (cf. Canada 2001; Rayner and Howlett 2008). The promotion of shellfish aquaculture at the community level makes economic sense, as it is significantly less capital-intensive than finfish aquaculture. According to Tollefson and Scott (2006), however, government promotion of shellfish aquaculture at the local level is politically strategic, as the practices and principles of community-based shellfish aquaculture are in some ways consistent with traditional Aboriginal usage of the resource (particularly in terms of caring for shellfish beds, as well as the principles of group ownership and custody).

We do not suggest that governments in Canada are promoting shellfish aquaculture at the local level solely as a means of justifying the expansion of corporate-dominated finfish aquaculture. There is little if any evidence

of such a strategy. From the perspective of regulation theory, however, the coincidence of devolution to community actors and to corporate actors is important, particularly because the latter is occurring on a much grander scale and over higher stakes (Young and Matthews 2007b; Young 2007). Devolution to corporate actors (in sectors with revenues in the hundreds of millions and even billions) characterizes the predominant *method of accumulation* in neoliberal resource regions. This prompts us to ask whether devolution to communities and increased state support for endogenous development are the other side of the neoliberal coin (a form of *social regulation* or compromise). In the Fordist-Keynesian era, the chief compromise for macroeconomic stability in resource regions involved collective bargaining and the extension of welfare-state institutions to the periphery (cf. Marchak 1983). In the emerging era of economic globalization and neoliberal governance, the compromise now appears to be based on the pairing of a liberalized corporate resource economy with a commitment to support ground-up, entrepreneurial, community-level development.⁵

The shift to neoliberal governance and strategies for economic development complicate the aquaculture controversy. As we will discuss in Chapter 2, many coastal community members and Aboriginal groups reject the implied neoliberal compromise of granting greater discretion to resource firms. While community empowerment is generally welcomed, many are deeply skeptical of the further extension of corporate authority over resource spaces. Moreover, as we will see in Chapters 6 and 7, state efforts to foster regional advantages and local/global linkages may be intensifying the conflict over aquaculture development. For instance, state programs such as WED and AOA, as well as arm's-length organizations such as Community Futures, have strongly endorsed tourism development in coastal areas. As industries such as tourism expand, so do potential conflicts with aquaculture, particularly over pollution, threats to the lucrative sport fishery, visual aesthetics, and the enclosure of navigable waters. The Fordist-Keynesian compromise came with real costs, particularly in the form of systematic environmental degradation and in the dependency of rural labour and communities on centralized authorities (Marchak 1983; Matthews 1983). In some ways, the emerging neoliberal compromise for resource economies and regions addresses these problems, but also creates new tensions in fostering flexible, diversified, "glocal" rural economies.

The Global Environmentalist Movement

The third global force that is profoundly shaping the aquaculture industry and controversy in Canada is the global environmentalist movement. This movement is based on a worldview that stresses the tight coupling of local and global ecologies, rights, and political issues. This paradigm is held and expressed across multiple activist movements, some of which are globally

organized while others are locally focused but deeply embedded in the globalist discourse. To begin, it is important to recognize that although the notion of a “global environment” is familiar to us now, this is a relatively new conceptualization, at least in its current place as a major cultural and political touchstone. As we will discuss below, some scholars suggest that the true birth of an identifiable “global environmental movement” occurred as late as the 1980s and 1990s, when issues such as nuclear safety, atmospheric ozone depletion, and global climate change began to dominate thinking about environmental health and integrity. If this is the case, it means once again that aquaculture has emerged under a very different set of political and cultural circumstances than Canada’s other major primary sectors. In this section, we present a brief overview of the emergence and shape of the global environmentalist movement, as well as some of its consequences for aquaculture development in Canada.

The rise of the contemporary environmentalist movement has been nothing short of remarkable. In a span of only a few decades, it has moved from the fringes to the centre of nearly every debate on industrial development. In this short time, environmentalist groups have successfully challenged governments and corporate actors on local, national, and global scales, often using controversial and confrontational means, while at the same time gaining and building public trust as authoritative voices on complex scientific issues (Yearley 2003, 41).

While the contemporary environmentalist movement has grown exponentially in recent years, it has deep roots and a complex history. Several scholars have noted the debt owed by modern environmentalism to religious mysticism as well as to the anti-modernist romanticism that emerged following the Enlightenment of the seventeenth and eighteenth centuries (cf. Cronon 1995; Palmer and Cooper 1998). Environmentalism in Europe and North America has a direct genealogical link to the preservationist movement that emerged in the nineteenth century. According to Macnaghten and Urry (1998, 36), “preservationism was a Victorian reaction against the Enlightenment mentality which assumed that nature was to be improved through human reason and interference.” In particular, the preservationist movement was a reaction against the spread of industry and urban development, arguing that built environments were unnatural and artificial spaces that impugned God’s cathedral in the form of natural and wild landscapes (Cronon 1995). Preservationism resonated with many members of the nineteenth-century intelligentsia, and was instrumental in establishing national parks and other protected wilderness areas, particularly in the United States and Canada. The preservationist movement continues to provide some of the most vivid cultural imagery regarding human encounters with wilderness and raw nature, particularly as represented in the writings of Henry David Thoreau and John Muir.

Despite these enduring legacies, preservationism was ultimately a limited social movement that succumbed to a more pragmatic “conservationism” in the early twentieth century (cf. Mazzotta and Kline 1995). While conservationism is itself a varied movement, generally speaking it draws on a rational and scientific view of the environment, specifically “a utilitarian desire to regulate nature through rational and efficient management” (Macnaghten and Urry 1998, 34). Conservationism has an ambiguous legacy in current environmentalism. On the one hand, one of the principal limitations of earlier preservationism was that it was imagined to apply chiefly in “special” places – areas that were to be set apart and protected from the march of human progress. In this sense, conservationism significantly broadened the scope of environmental management, being based on the understanding that natural resources were not inexhaustible and required regulation and protection from reckless development and exploitation. Indeed, the dominant postwar resource management strategy in North America has been conservationist, based as it is on the principle that limitations must be placed on natural exploitation, a view that was radical in its day (Hayter 2000). On the other hand, conservationism has led down some very destructive paths. The idea of rational management implies a certain hubris with respect to human capacities to know and predict the natural environment. We need only look to the Canadian experience with the collapse of the Atlantic cod fishery to appreciate the costs of incomplete knowledge and an overly pragmatic approach to environmental management.

The current environmentalist movement continues to grapple with the issues raised by the preservationist and conservationist perspectives, as evidenced by ongoing debates regarding the appropriateness of “sustainability” as an environmental narrative (given its close association with rational management). What distinguishes the present environmentalist movement from prior perspectives and activism is its focus on global issues, and more precisely the intersection of local and global environmental challenges. As mentioned, preservationism was primarily directed at specific spaces. In Macnaghten and Urry’s words (1998, 37), it was a movement “to regulate boundaries, especially between town and country” – the realm of humanity and that of wilderness (see also Cronon 1995). While conservationism broadened the scope of environmental discourse and management, the emphasis on boundaries remained, given that natural environments were to be managed in the best interests of regions, states and provinces, and nations. According to McCormick (1995, 56), the emergence of a “New Environmentalism” implied a change both in the scale of environmental consciousness and in the core problematic posed by the human/nature dynamic: “If nature preservation had been a moral crusade centred on the non-human environment, and conservation a utilitarian movement based on the rational management of natural resources, New Environmentalism

addressed the entire human environment. For preservationists, the issue was wildlife and habitats; for conservationists, the issue was natural resources; for the New Environmentalists, human survival itself was at stake."

McCormick's concept of a New Environmentalism addresses two key shifts in the environmentalist movement that began in the 1960s: the emergence of a global consciousness and a heightened concern with dramatic or apocalyptic environmental change. Concern with global problems and concern with apocalyptic scenarios went (and still go) hand in hand. Macnaghten and Urry (1998) point to the publication of Rachel Carson's *Silent Spring* in 1962 as a particularly important watershed moment in modern environmentalism. Carson's book, which sold 500,000 copies, outlined the consequences of industrial usage of pesticides on wildlife, particularly among animals occupying high places on the food chain, which would be exposed to damaging and even lethal concentrations of chemicals. For Carson, the boundaries of place, region, nation, and continent that had been presumed under preservationist and conservationist conceptions of environment were nonsensical, given the cumulative dangers unleashed by unfettered global industrial development. In short, the globality of the problem spoke directly to its apocalyptic potential. This was not a problem that could be fixed or regulated in any one place. Even the metaphor of a "silent spring" implied the mobility and transnationality of this problem, as toxins migrated along with their avian victims. According to Macnaghten and Urry (1998, 45):

Carson painted a picture of a world in mortal danger, a danger systematically and cynically produced by the greed and self-interest of the pesticides industry. Even more significant was the diagnosis that these "elixirs of death" which entered the human body were a direct by-product of the post-war zeal for modernization and technological improvement. While previous concerns had centred on the aesthetics of suburbanization, or local pollution incidents, or the loss of particular habitats, Carson's critique centred on a representation of nature as systematically threatened by modern industrial processes.

Carson was joined by other prophets of doom, who used strong scientific language to make their cases (Macnaghten and Urry 1998, 45). Among the most influential of these were Paul Ehrlich (on world population growth), Garrett Hardin (on "the tragedy of the commons"), and Barry Commoner (on pollution and toxins). According to Jasanoff (2004), at the same time that discussion of such global problems was entering the public and political arena, humanity's environmental imagination was forever changed by the dissemination of some of the most iconic images ever taken – those of Earth from space. These images, in which political boundaries are both imperceptible and irrelevant on a small blue and white ball, have had a profound

cultural impact. In the words of astronaut William Anders, who filmed the famous “earth rise” on the Apollo 8 mission: “We came all this way to explore the moon, and the most important thing is that we discovered the Earth.”

From the 1960s onward, this understanding of environmental problems as being both global and apocalyptic gained significant public and political credibility. The first Earth Day was held in April 1970 and drew hundreds of thousands of demonstrators to the streets in the United States alone (McCormick 1995, 79). The United Nations held its first major conference on environmental issues in 1972 in Stockholm, Sweden. Among the most enduring implications of this New Environmentalism is the notion that growth itself – particularly industrial development and population growth – is the primary cause of environmental degradation and risk. While preservationism and conservationism advanced criticisms of the excesses of industry, modern environmentalism takes the critique of industrial development as its core. From the beginning, this critique has been global in orientation, as is evident in the famous Club of Rome experiment in computer-modelling global environmental degradation based on contemporary trends in population growth, resource depletion, and industrial development (see Meadows et al. 1972). While the prophets of doom were criticized by contemporaries for sensationalizing their findings (e.g., Cole 1973), governments and other institutions responded in ways that reinforced the links that were being forged among the ideas of globality, growth, and the potential for apocalyptic outcomes. The most famous example of such a response was the World Commission on Environment and Development, established by the United Nations in 1983 and chaired by Gro Harlem Brundtland, former prime minister of Norway. The “Brundtland Report,” entitled *Our Common Future*, embraced many of the claims of the global environmentalist movement, pointing to growth as the major threat facing the global environment and advancing the notion of sustainable development as a key to mitigating the problem. This term, here referring to “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland 1987, 8), has since become central to nearly every debate over industrial development, including the aquaculture controversy in Canada. While the notion of sustainability has since become highly malleable, the Brundtland Report is fairly unequivocal, stating in language reflecting the clarion call of global environmentalism: “Sustainable global development requires that those who are more affluent adopt lifestyles within the planet’s ecological means ... We do not pretend that the process will be easy or straightforward. Painful choices have to be made. Thus, in the final analysis, sustainable development must rest on political will” (Brundtland 1987, 9).

Since the 1980s, the global environmentalist movement has grown in size and sophistication. As previously mentioned, its greatest achievement has

been its ability to link local and global issues and conflicts. This ability would not be possible without the heightened awareness of globality among the general public, experts, and institutions, as discussed above. Environmentalist groups have worked very hard to establish themselves as authorities on issues across both local and global scales, however. Environmental activism on a global scale is dominated by large, globally structured environmentalist groups such as Greenpeace, the World Wildlife Fund (WWF), and Friends of the Earth. What is singularly impressive is that these groups retain the ability to descend into very local issues – to lend their significant resources and legitimacy to issues that would otherwise be considered local, minor, or bounded conflicts.

This capability has blindsided the aquaculture industry in Canada. As mentioned in the Introduction, the aquaculture industry in Canada attracted very little attention from environmentalist groups until the mid-1980s. From then on, however, it has been subjected to highly organized and sophisticated opposition campaigns that have successfully mobilized protest and activism in both local and global spaces. In the case of aquaculture, as with many other environmentalist campaigns, the ability to act on multiple scales hinges on activist groups' strategy of forming networks and coalitions, which enhances both the reach and effectiveness of environmentalist protest (Rootes 1999). The network model enables activists to pool resources and concentrate their message in local settings. The benefits of this strategy are evident in the success of the Coastal Alliance for Aquaculture Reform (CAAR), which is composed of major British Columbia environmentalist groups that oppose aquaculture, including the David Suzuki Foundation, the Georgia Straight Alliance, and the Friends of Clayoquot Sound. While each of the member groups continues its individual campaign against the industry, the CAAR is a key vehicle for fundraising and coordination of protest efforts. As a one-issue coalition, it has been very successful in attracting media and public attention through press releases, slogans (e.g., "Farmed and Dangerous"), and street protests.

The network model also enables environmentalist groups to disseminate protest and claims well beyond local settings. For instance, organizations such as Greenpeace and the World Wildlife Fund have sponsored activities such as "dialogue conferences" and direct protests in the United States and elsewhere on the subject of Canadian aquaculture (cf. Greenpeace 2004; World Wildlife Fund 2004). Sophisticated networks and coalitions exist at the global level as well, with organizations such as the Seafood Choices Alliance (SCA) counting among its members giant environmentalist groups such as Greenpeace, the WWF, the Wildlife Conservation Society, Environmental Defence, the Pew Institute, and Ecotrust among its members, as well as small and locally oriented groups such as British Columbia's Living Oceans Society and the Vancouver Aquarium. The SCA has been quite active in

consumer affairs, leading boycotts of aquaculture products in the United States and pressuring restaurants and grocers to take aquacultured finfish off their menus and shelves.

Like many other industries that have found themselves suddenly pressured by extensive and aggressive opposition coalitions, Canada's aquaculture sector has a mixed record in responding to environmentalist claims and strategies (cf. Leiss 2001). As we will discuss in Chapter 3, the industry and its supporters have failed to anticipate and mitigate some key objections raised by opposition groups, particularly with respect to disease threats to wild species and the spectre of toxins in aquaculture products (Leiss and Nicol 2006). The challenge presented to Canadian aquaculture by environmentalist activism goes far beyond these specific issues, however. We argue that the ability of environmentalist groups to pursue strong agendas at both local and global scales has contributed to two profound developments in the aquaculture controversy.

First, the environmentalist movement's successes in local-scale activism has enhanced the validity of local voices. To be clear, not all local voices are environmentalist. As we will discuss in the next chapter, local perceptions and opinions on aquaculture and the environment are highly varied. Nevertheless, local-scale environmental activism has raised issues about the rights of stakeholders to say no to aquaculture even if senior governments are permitting development to proceed. In response, industry supporters are mobilizing their own pro-aquaculture grassroots movements (through groups such as Positive Aquaculture Awareness and the First Dollar Alliance). This places even more emphasis on local-level debates and conflicts.

Second, the environmentalist movement's ability to make this issue global – essentially bringing the controversy to dinner tables, grocery stores, and activist networks far removed from coastal Canada – has legitimized the participation of non-local voices in the controversy. In a sense, the globalization of the aquaculture controversy has been predictable. Several high-profile resource conflicts “went global” in the 1980s and 1990s due to the dedication of internationally connected activists, including British Columbia's “war in the woods” and the annual conflicts over seal hunting in Quebec and Newfoundland and Labrador. It is equally true, however, that very few local or regional environmental issues do in fact go global (Yearley 2005), and participants in the Canadian aquaculture industry are deeply frustrated with what many understand to be outside interference in a regional issue.

In summary, the discourse and structure of the global environmentalist movement means that the struggle over Canadian aquaculture is both local and global. The flexibility of this activism is a major challenge to the industry and its supporters, who often find themselves forced to react and rebut activist campaigns both in Canada and in key consumer markets in the United States (see Chapter 3). But the globalization of the aquaculture controversy

is not just about activism. The environmentalist movement is a conduit for the circulation of claims and knowledge about aquaculture across geographic lines and political solitudes. Environmental networks bring concerns of local significance, such as the importance of wild salmon and other fisheries to Aboriginal and non-Aboriginal coastal people, into the mainstream of public consciousness. At the same time, environmentalist activism brings global, particularly urban, opposition into local spaces. For better or for worse, this greatly multiplies the voices involved in the debate over aquaculture development, as well as the range of knowledge and claims available to participants in the debate. Organized environmentalism is what has made this a truly public controversy. It has broken down traditional notions of who is a stakeholder, who is an expert, and how and where arguments are made about the future of the industry.

Aquaculture in a Global Context

The aquaculture controversy in Canada is in many ways the child of context and circumstances. Aquaculture is unlike any other resource or agricultural sector in Canada simply because of its novelty. As a new industry, it has been formed in a unique crucible, shaped by structural and cultural forces that differ significantly from the circumstances that shaped Canada's more established primary sector economies.

First, economic globalization has meant that Canadian aquaculture has started from a position of market weakness. To date, the Canadian aquaculture industry has been caught between the "high road" and "low road" to globalization. While Canadian governments have invested heavily in aquaculture research and development, the industry remains strongly dependent on the export of minimally processed consumer products to the United States (PWC 2003; CAIA 2005a). Prospects for moving up the value chain are dim, given that Third World producers such as Chile, with low costs for labour and environmental compliance, already dominate value-added markets in the US. Moreover, the recent rise of the Canadian dollar has negated one of the few cost advantages for Canadian producers. Therefore, although Canada's aquaculture sector is robust and has potential for significant growth, it is also precarious. In Rayner and Howlett's words (2008, 121), Canadian aquaculture is "caught in a vise" between the industry's need to expand to reach a critical mass necessary for survival and its heavy reliance on a limited product line in a singular export market.

Second, the rise to prominence of neoliberal approaches to economic development means that governments are less willing to pursue centralized plans and programs for development, and are increasingly decentralizing and devolving responsibility and authority for resource management and development to both corporate and local actors. This is advantageous to large aquaculture firms, as it grants them more discretion over production.

It also means, however, that communities have more at stake, and more to say, with regard to local and regional development. Local entrepreneurship, which is a central goal of neoliberal development policy, can itself become an obstacle to the aquaculture industry. As new industries such as tourism and the sport fishery mature, conflicts over environment, marine use, and aesthetics can intensify. The neoliberal vision of fostering regional advantages and “glocal” economies becomes complicated when conflicts arise about what these advantages are and what other interests and opportunities may be sacrificed in their pursuit.

Last, the emergence of global environmentalist discourses and activism has linked Canadian aquaculture to the notion of global environmental risk and problems of large-scale industrial development more generally. On the surface, Canadian aquaculture appears to be an issue of concern only in certain regions and locales. Environmental networks, however, have effectively mobilized narratives of consumer health and environmental degradation to make this a global-scale controversy. In doing so, these networks have popularized the conflict, brought significant media attention to bear on the issue, and disseminated claims about Canadian aquaculture across the nation and around the world.