

**Studying Canadian Aquaculture Policy:
Issues, Gaps, and Directions**

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Abstract:

After almost a century of benign neglect, Canadian aquaculture policy emerged in its modern form after 1984, when the federal government led a complex intergovernmental process of policy renewal. After an initial period in which the foundations for the new policy were laid through intergovernmental agreements, both the federal and provincial governments adopted numerous policies aimed at the promotion of the aquaculture industry. This paper assesses these developments and trends in Canadian aquaculture policy against the emerging issues affecting the sector in the near to medium term.

1. Introduction¹

Aquaculture in Canada is a small but rapidly-growing resource sector. It is composed of two basic industries, the shellfish and finfish sectors, which use very different techniques to produce different species of marine animals. Shellfish volumes and values remain much smaller than their finfish equivalents at present, with finfish output accounting for about 75% of total volume and 88% of value of total Canadian production. The Canadian finfish industry, up until now based largely on Atlantic salmon (*Salmo salar*) has enjoyed phenomenal growth in output over the last two decades. Output in 2001 alone showed a 25% increase over 2000 levels, reaching 107,700 tonnes. Canadian shellfish production grew by 17% over the same period to 33,900 tonnes. The value of Canadian finfish output, which was over \$684m in 2001, is already beginning to level off as the weakness of the US economy combines with overproduction and fierce competition between the two major producing countries, Chile and Norway, to drive down world prices. Shellfish values, where the species mix is also more diverse, have held up rather better, increasing interest in the sector.²

The very rapid growth rates over the last decade are, of course, not unique to Canada. The declines in many significant capture fisheries around the world combined with increasing world demand for seafood products has led to concerns about food security. Aquaculture has been widely promoted by governments and international agencies such as the FAO as an essential tool to address the security issue. World farmed salmon production volumes surpassed the wild fishery in 1997 and the development of new farmed species such as cod and tuna is well advanced. Rosy forecasts are common. Former federal fisheries minister Herb Dhaliwal has predicted a Canadian industry worth \$2bn by the end of the decade.³ A widely quoted report by Coopers Lybrand for the federal Western Economic Diversification (WED) program has suggested that the value of British Columbia shellfish production alone could climb from \$12 million to \$100 million between 1997 and 2006.⁴ The possibility of creating thousands of new jobs in coastal communities hard hit by declines in other resource sectors has helped persuade governments like that of British Columbia to lift moratoria on new shellfish and finfish farm tenures and launch policies such as the Shellfish Development Initiative aimed at doubling areas under tenure over the next decade.

¹ Research for this paper was carried out under the auspices of grants from the Aquanet National Centre of Excellence and the SSHRC Federalism and the Federation Programme. We would like to thank Jonathan Fershau and Andrea Migone for their able research assistance.

² PriceWaterhouseCoopers, Northern Aquaculture Statistics 2001, available at <http://www.pwcglobal.com/extweb/ncsurvres.nsf/DocID/F3684CCE155D875D85256C210067AD1E> (accessed May 23, 2001)

³ Cited in Canada, Senate, Standing Committee on Fisheries, Aquaculture in Canada's Atlantic and Pacific Regions, online at <http://www.parl.gc.ca/37/1/parlbus/commbus/senate/com-E/fish-e/rep-e/repintjun01-e.htm>

⁴ Coopers Lybrand, Economic Potential of the British Columbia Marine Aquaculture Industry – Phase One, Shellfish, 1997

Yet, in spite of the optimism and the apparent convergence of government policy on promoting aquaculture development, progress remains limited in many parts of Canada. In spite of efforts to diversify into new species and new locations, the finfish industry remains dominated by the production of Atlantic salmon in a restricted number of locations in BC and New Brunswick. In addition to the weakness of international farmed salmon prices and the shaky financial state of some of the world's largest companies with operations in Canada, Canadian producers now face significant scrutiny by a coalition of traditional fishers, First Nations and environmentalists concerned about the impacts of the industry on the marine environment and on surviving stocks of wild fish. Such concerns have been raised at every stage of the production process, from the use of wild fish stocks to make feed pellets, through the impact of wastes, parasites and diseases on local wild stocks, to the human health implications of therapeutic residues and colourants in the final product. The environmental coalition has adopted tactics familiar from other resource areas, alleging collusion between industry and government to suppress unpleasant facts about the impacts of finfish aquaculture and targeting US consumers with a slick "Farmed and Dangerous" campaign that has encouraged restaurant-goers to demand wild salmon and pressured some large US retailers to label farmed salmon as artificially coloured.⁵

While the shellfish industry has, until recently, enjoyed rather less intense scrutiny from environmentalists, it has experienced plenty of problems of its own. In BC, for example, half way through the SDI the value of farmed shellfish has barely reached a quarter of the way towards the ten-year target. Problems of intergovernmental coordination, premature tenure expansion announcements without adequate consultation of local communities, uncertainty surrounding unresolved First Nations' claims and their impact on the foreshore and coastal waters, declining water quality in traditional growing areas, lack of processing facilities and distribution networks for expanded production, and a host of other factors have surfaced. In PEI, perhaps the most successful example of shellfish industry expansion in Canada, weakening mussel prices, allegations of dumping in US markets, and increasing conflicts with other users have marked the expansion of the industry. A high profile action in the Federal Court by the Sierra Club opposing a 1400 acre mussel aquaculture development by a PEI company near the Cabot Trail in Nova Scotia suggests the difficulty of expanding operations beyond the Island and is indicative that shellfish aquaculture, widely promoted as a "green" industry, is now on the environmentalists' radar screen. In BC and elsewhere shellfish aquaculture development now faces the same kind of serious legitimation problems which have bedeviled the finfish sector, threatening not only the future industry, but those operations already established.⁶

⁵ www.farmedanddangerous.org

⁶ See Stephen Hume, "We are going to stop these fish farms: Omega Salmon's Hatchery at Ocean Falls Has Become a Lightning Rod for B.C.'s Growing Aboriginal Rebellion" *Vancouver Sun*, 1 March, 2003 p. A21; Scott Simpson, "Fishery Officials License Illegal Catch" *Vancouver Sun*, 7 February, 2003 p. D3; Jeff Rud, "Fish Farm Adviser an Aquaculture Supplier, NDP's MacPhail Says", *Vancouver Sun*, 13 February, 2003 p. A19; Scott Simpson, "Shellfish Farms 'Disrupt; Beaches'" *Vancouver Sun*, 10 January, 2003, p. F1; Stephen Hume, "'Lessons Not Learned' in Ireland' Sea Trout Supported a Thriving Business – Until Sea Lice Wiped Them Out", *Vancouver Sun*, 22 February, 2003 p. A4; Craig McInnes and Judy LaVoie, "Van Dongen Embroiled in Row Over Fish Farm, Papers Show" *Vancouver Sun*, 5 February, 2003 p. A3

This record raises many issues related to how policy-making in this sector has been designed and the principles followed by policy-makers in their activities. As shall be argued below, policy-makers have generally ignored or failed to act in accordance with recent thinking on policy design and governance and instead have carried forward a policy process typical of an earlier era of staples resource development. Whereas in early periods such development was often accepted as an end-in-itself by local populations who were generally supportive of its expansion, in the modern era more sophisticated policy-making is required which not only focuses on the use of policy instruments to promote industrial activity, but also those required to legitimate the process.⁷ Rather than create a system of 'smart regulation' for the post-staples era, as the Australian political scientist Neil Gunningham has termed it,⁸ Canadian policy-makers have until recently pursued a single-minded focus on industrial promotion, while leaving existing weak procedural instruments – notably industry-based advisory panels – in place. Although policy-makers are currently responding to the emerging crises in the sector with a plethora of consultations and other procedural devices, the requisite co-ordination is lacking and these ill-considered consultations themselves are now engendering additional problems in the sector.⁹

2. Aquaculture as a Problematic Post-Staples Industry

A "staple" refers to a raw, or unfinished bulk commodity product which is sold in export markets. Timber, fish and minerals are staples, usually extracted and sold in external markets without significant amounts of processing and with very little control over the price exported goods receive in foreign markets.¹⁰ The significance of having an economy based on exporting unfinished bulk goods lies not only in how it affects policy-making by creating continuing issues with resource location and availability, but also in how populations in staples-dependent areas react to their continued vulnerability to international market conditions. As Naylor and others have shown, the development of a staple-based economy, for example, triggers government investments in areas such as transportation and communications infrastructure designed to efficiently extract and ship goods to markets as well as provisions of export subsidies and credits designed to facilitate trade.¹¹

7 Randolph, John and Michael Bauer. "Improving Environmental Decision-Making Through Collaborative Methods." Policy Studies Review. 16, no. 3/4 (1999): 168-191.

8 Gunningham, Neil, Peter Grabosky, and Darren Sinclair. Smart Regulation: Designing Environmental Policy. Oxford: Clarendon Press, 1998.

9 On the issue of poorly integrated consultations, generally, see Cook, Dee. "Consultation, for a Change? Engaging Users and Communities in the Policy Process." Social Policy and Administration. 36, no. 5 (2002): 516-531 and Wondelleck, J.M., N.J. Manring, and J.E. Cowfoot. "Teetering at the Top of the Ladder: The Experience of Citizen Group Participants in Alternative Dispute Resolution Processes." Sociological Perspectives. 39, no. 2 (1996): 249-262. With respect to the problems encountered in the aquaculture sector see Suryanata, Krisnawati and Karen N. Umemoto. "Tension at the Nexus of the Global and the Local: Culture, Property and Marine Aquaculture in Hawai'i." Environment and Planning A. 35, no. 2 (2003): 199-213.

¹⁰Innis, H.A. The Fur Trade in Canada. Toronto: University of Toronto Press, 1930; H.A. Innis, Problems of Staple Production in Canada. Toronto: Ryerson Press, 1933.

¹¹ See Naylor, R. T. "The Rise and Fall of the Third Commercial Empire of the St. Lawrence." In G. Teeple, ed(s), Capitalism and the National Question in Canada. Toronto: University of Toronto Press, 1972; Hodgetts, J. E. The Canadian Public Service. Toronto: University of Toronto Press, 1973; Stone, Frank. Canada, the GATT and the International Trade System. Montreal: Institute for Research on Public Policy, 1984; and Whalley, John. Canadian Trade Policies and the World Economy. Toronto: University of Toronto Press, 1985

As most staples-based countries have a monopoly or near-monopoly on the production of only a very few resources or agricultural goods, producers must sell at prices set by international conditions of supply and demand. While international demand for most resources—outside of wartime—has increased at a relatively steady but low rate, world supplies of particular primary products are highly variable. A good harvest, or the discovery of significant new reserves of minerals or oil, or the addition of new production capacity in the fishery or forest products sectors can quickly add to world supplies and drive down world prices until demand slowly catches up and surpasses supplies, resulting in sudden price increases triggering a new investment cycle and subsequent downturn.¹² As Cameron has noted, these fluctuations in international supplies account for the “*boom and bust*” cycles prevalent in most resource industries and, by implication, most resource-based economies, and lead affected populations to press governments to provide a range of social, unemployment and other types of insurance schemes as well as make large-scale public expenditures in areas of job creation and employment.¹³

The legacy of a staples economy raises several overlapping problems for resource and environmental policy-making in Canada. In particular, a staples economy pits economic interests and activities involved in resource harvesting and exploitation against environmental activities such as wilderness, species and habitat preservation, and these types of conflicts have been a hallmark of Canada's initial post-1984 experience with aquaculture regulation.¹⁴ In Canada, unlike many other developed countries concerned with issues such as urban pollution or toxic wastes, the key environmental issues of the 20th century were those related to resource management concerns involving conflicts over existing or potential resource extraction and transportation activities. These have included the designation and protection of wilderness areas and other decisions to exempt lands from resource exploitation or related activities such as pipeline and hydro-electric generation or transmission; pollution regulation related to natural resource producing industries such as smelters or pulp and paper manufacturing facilities; pesticide and herbicide management issues related to intensive silviculture and other forest industry-related activities; and disputes over harvesting and extraction methods such as clearcut logging, wolf, bear and game hunting, fur trapping, deep-sea dragging, and offshore-drilling, among others.¹⁵ Throughout this period, Canadian governments attempted to balance support for resource mega-projects and existing

¹² See Anderson, F.J. Natural Resources in Canada. Toronto: Methuen, 1985; Wilkinson, B. “Canada’s Resource Industries.” In J. Whalley, ed(s), Canada’s Export Industries and Water Export Policy. Toronto: University of Toronto Press, 1985; and M.C. Webb and M.W Zacher, Canada and International Mineral Markets: Dependence, Instability and Foreign Policy Kingston: Queen’s University centre for Resource Studies, 1988.

¹³ Cameron, David R. “The Growth of Government Spending: The Canadian Experience in Comparative Perspective.” In State and Society, edited by K. Banting. Toronto: University of Toronto Press, 1986. 21-52.

¹⁴ Leiss, William, ed. Ecology versus Politics in Canada. Toronto: University of Toronto Press, 1979. Estrin, David. “Environmental Law.” Ottawa Law Review. 7, no. 2 (1975): 397-449; Schrecker, Ted. “The Political Context and Content of Environmental Law.” In T. Caputo, ed(s), Law and Society: A Critical Perspective, Toronto: Harcourt, Brace Jovanovich, 1989. 173-204 and Swaigen, John. “Environmental Law 1975-1980.” Ottawa Law Review. 12, no. 2 (1980): 439-488. See also Jeffery, M.I. “Environmental Enforcement and Regulation in the 1980’s: Regina v. Sault Ste. Marie Revisited.” Queens Law Journal. 10, no. 1 (1984): 43-70;

¹⁵ Artibise, Alan F.J. and Gilbert A. Stelter. “Conservation Planning and Urban Planning: The Canadian Commission of Conservation in Historical Perspective.” In R. Kain, ed(s), Planning for Conservation, New York: St. Martins, 198; Doern, G. B. and Thomas Conway. The Greening of Canada: Federal Institutions and Decisions. Toronto: University of Toronto Press, 1994; and Emond, D.P. “Environmental Law and Policy: A Retrospective Examination of the Canadian Experience.” In I. Bernier and A. Lajoie, ed(s), Consumer Protection, Environmental Law and Corporate Power, Toronto: University of Toronto Press, 1985. 89-179.

resource industries with environmental protection, creating a policy regime focusing on environmental assessments and mitigation in so doing.¹⁶

This regime was not always proven successful in balancing these two interests and aquaculture is a good case in point. Governments forced to choose between resource extraction and preservation, for example, have usually greatly favoured resource exploitation. Only if they were forced by international pressure to abandon or reduce harvesting activities, including consumer boycotts as occurred in the harp seal harvest on the East Coast or rainforest logging on the West Coast, did they reluctantly do so.¹⁷ Similarly, park designations were often made only after resources had been removed, or the terms of reference for their establishment were written to allow continued resource extraction to occur, or, as was frequently the case, parkland designations represented trade-offs between ecological protection in one area and increased harvesting and extraction in other, non-park, areas.¹⁸ Many similar examples of the tension between extraction and protection in Canadian environmental policy can also be found. These range from the preference for the sale of CANDU reactors trumping concerns related to the storage and disposal of nuclear waste, to the overweening concern for employment in Newfoundland that led to the complete collapse of the province's cod fishery in the early 1990s, and the continuing concerns for employment and investment in the oil and gas sector that characterize Canada's internal debate on the implementation of the Kyoto Protocol and the reduction of greenhouse gas emissions.¹⁹

While most observers would agree that historically Canada can be characterized as a staples economy and that this has had a significant impact on the evolution of Canada's environmental regime and practice, there is considerable disagreement over whether this depiction continues to characterise the economy and whether and to what extent it will continue to do so in future years.²⁰ Earlier debates within the staples school itself centered on whether Canada had emerged as an industrial power in the wake of the wheat boom and manufacturing activities associated with the First World War.²¹ While the failure of the

¹⁶ Benidickson, Jamie. "Environmental Law Survey: Part I." *Ottawa Law Review* 24, no. 3 (1992): 734-811; Benidickson, Jamie. "Environmental Law Survey: Part II." *Ottawa Law Review* 25, no. 1 (1993): 123-154. On assessments, generally see Bowden, Marie-Ann and Curtis, Fred. "Federal EIA in Canada: EARP as an Evolving Process." *Environmental Impact Assessment Review*, 8, no. 1 (1988): 97-106; Mitchell, B. and R. Turkheim. "Environmental Impact Assessment: Principles, Practices, and Canadian Experiences." In R. R. Krueger and B. Mitchell, ed(s), *Managing Canada's Renewable Resources*, Toronto: Methuen, 1977. 47-66 and Rees, William E. "EARP at the Crossroads: Environmental Assessment in Canada." *Environmental Impact Assessment Review*, 1, no. 4 (1980): 355-377.

¹⁷ On the seal hunt see Busch, Briton Cooper. *The War Against the Seals: A History of the North American Seal Fishery*. Montreal: McGill-Queen's University Press, 1985 and Wenzel, George. *Animal Rights, Human Rights: Ecology, Economy and Ideology in the Canadian Arctic*. London: Belhaven Press, 1991. On west coast logging and environmental disputes see Wilson, Jeremy. *Talk and Log: Wilderness Politics in British Columbia*. Vancouver: UBC Press, 1998.

¹⁸ See McNamee, Kevin. "From Wild places to Endangered Spaces: A History of Canada's National Parks." In P. Dearden and R. Rollins, ed(s), *Parks and Protected Areas in Canada: Planning and Management*, Toronto: Oxford University Press, 1993. 17-44.

¹⁹ See Finch, R. *Exporting Danger: A History of the Canadian Nuclear Energy Export Programme*. Montreal: Black Rose Books, 1986; Apostle, Richard et al. *Community, State and Market on the North Atlantic Rim: Challenges to Modernity in the Fisheries*. Toronto: University of Toronto Press, 1998; Hutchings, Jeffrey A., Carl Waters, and Richard L. Haedrich. "Is Scientific Inquiry Incompatible with Government Information Control?" *Canadian Journal of Fisheries and Aquatic Science*, 54(1997): 1198-1210; and Jaccard, Mark. "Costing Greenhouse Gas Abatement: Canada's Technological and Behavioural Potential." *Isuma*, 2, no. 4 (2001): 45-52

²⁰ Howlett, Michael. "Canadian Environmental Policy and the Natural Resource Sector: Paradoxical Aspects of the Transition to a Post-Staples Political Economy." In E. Lee and A. Perl, ed(s), *The Integrity Gap: Canada's Environmental Policy and Institutions*, Vancouver: University of British Columbia Press, 2003.

²¹ See Bertram, Gordon W. "Economic Growth and Canadian Industry, 1870-1915: The Staple Model and the Take-off Hypothesis." In *Canadian Journal of Economics and Political Science* 29, no. 2 (1963): 162-184 and Richards, John. "The Staple

manufacturing sector to grow outside of wartime led to the re-emergence of staples analysis in the 1960s and 1970s,²² current debates focus less on the impact of a transition from primary to secondary activities than they do upon the undeniable growth in service sector employment and production in the post World War II era.²³ The idea that the economy has entered a new "post-staples" mode has led to a variety of debates in Canada concerning the consequences for government policy-making.²⁴

As Thomas Hutton has observed, "mature, advanced" staple economies have several common features which can be combined into a typical political economic profile. These include the substantial depletion of original resource endowments and consequent increasing pressure from "environmental" groups to inhibit traditional modes of resource extraction and stimulate development alternatives; the increasing capital- and technology-intensiveness of resource extraction processes and consequent decrease in employment in the staples sector, the evolution of development from 'pure' extraction to increased refining and secondary processing of resource commodities, and diversification of economic structure with growth in non-staples related areas such as, tourism, and local administration and services.²⁵

While a mature staples political economy may still be characterized as "resource dependent", the economy is more diffused and diversified than in the past. As Hutton suggests, if this diffusion, diversification, and resource depletion continues, then an economy may make a further transition towards a "post-staples" one in which severe pressures on the critical resource sector coupled with the prospect of even more substantial contractions in the near future lead to an internal reconfiguration of growth and development. Typically this would involve a significant increase in metropolitan shares of population and employment, the emergence of regional economic centres and the decline of smaller resource-dependent communities.²⁶ The progression of parts of Canada towards a 'post-staples' political economy both supports and contradicts key suppositions of the traditional staples analysis of Canada's future path of economic development and has significant consequences for many policy areas, including that of the environment.²⁷

Debate." In D. Cameron, ed(s), Explorations in Canadian Economic History: Essays in Honour of Irene M. Spry, Ottawa: University of Ottawa Press, 1985.

²² See Drache, Daniel. "Re-discovering Canadian Political Economy." In W. Clement and D. Drache, ed(s), A Practical Guide to Canadian Political Economy, Toronto: Lorimer, 1978 and Williams, Glen. Not for Export: Toward a Political Economy of Canada's Arrested Industrialization. Toronto: McClelland and Stewart, 1983

²³ See Clement, Wallace and G. Williams, ed. The New Canadian Political Economy. Montreal: McGill-Queens University Press, 1989; and Clement, Wallace, ed. Understanding Canada: Building on the New Canadian Political Economy. Montreal: McGill-Queen's University Press, 1997. On the service sector specifically see Warton, David A. "The Service Industries in Canada 1946-1966." In V. R. Fuchs, ed(s), Production and Productivity in the Service Industries, New York: Columbia University Press, 1969 and Grubel, Herbert G. and Michael A. Walker. Service Industry Growth: Causes and Effects. Vancouver: Fraser Institute, 1989.

²⁴ Many of these discussions centre on the role of technology in driving service sector development. See Anderson, R. et al., ed. Innovation Systems in A Global Context: The North American Experience. Montreal: McGill-Queen's University Press, 1998; Niosi, J. "Canada's National System of Innovation." In Science and Public Policy 18, no. 2 (1991): 83 and Niosi, J., ed. Technology and National Competitiveness: Oligopoly, Technological Innovation and International Competition. Montreal: McGill-Queen's Press, 1991.

²⁵ Hutton, Thomas A. Visions of a 'Post-Staples' Economy: Structural Change and Adjustment Issues in British Columbia. 1994. Vancouver: Centre for Human Settlements. PI #3, pp. 4-5.

²⁶ Adapted from Hutton, Thomas A. Visions of a 'Post-Staples' Economy: Structural Change and Adjustment Issues in British Columbia. 1994. Vancouver: Centre for Human Settlements. PI #3, pp. 1-2.

²⁷ Howlett, Michael. "De-Mythologizing Provincial Political Economies: The Development of Service Sectors in the Provinces." In C. Dunn, ed(s), Provinces: Canadian Provincial Politics, Peterborough: Broadview Press, 1996. 423-448.

Viewed in this context, Canada aquaculture can be seen to be a problematic post-staples industry that raises complex regulatory issues. In the finfish case, the industry has developed very rapidly but unevenly across the country. The leading province, British Columbia, is also the fourth-largest producer of farmed salmon in the world and the problems raised by aquaculture for a post-staples economy are most clearly delineated here. At the same time as rapid growth in output, the BC industry has seen equally rapid consolidation, moving from over 100 companies in 1988 to only 12 in 2003. The capital for the transition has come largely from Norwegian multinationals, which have bypassed Vancouver and created a regional economic centre in Campbell River. Feed and equipment are produced in Canada and exported to other jurisdictions and there is significant investment in hatcheries producing juveniles for growing out on the farms²⁸. Significant resources are being deployed in researching technological solutions to problems in the industry, such as reducing the amount of fish protein in food pellets and providing increased resistance to the diseases and parasites found in sea cage culture. While it is true that aquaculture is seen by the state as a valuable substitute for the declining capture fishery, the environmental discourse is more complex than in Hutton's original picture. Aquaculture is accused by environmentalists and fishers alike of contributing to the decline of wild stocks and consequently does not function as an environmentally friendly substitute that would allow the recovery of an overexploited natural resource. Conflicts with other elements of the post-staples economy, notably tourism, add to the mix of interests. As yet, it is unclear whether other provinces are merely further behind BC but on the same path or whether a more diverse mix of species and technologies will produce a different kind of industry in the Atlantic provinces

Shellfish aquaculture seems to be on similar trajectory, with PEI as the most advanced province. While the industry remains considerably smaller and less capital intensive than its finfish counterpart, we see the beginnings of a consolidation into a smaller number of large companies engaged in more intensive forms of cultivation. Much the same complex post-staples alignments of interests can be observed here as well, at least in embryonic form. Shellfish farming is beginning to be accused of disrupting natural coastal ecosystems rather than taking resource pressure away from them, with alleged negative impacts on migratory birds and their habitat leading the list of charges. There are visual and other social impacts on owners of waterfront properties and conflicts with the increasingly important tourism and recreation industries. Leasing beaches and nearshore waters for shellfish production often ends up excluding other users, sometimes those engaged in traditional wild fisheries of shellfish species other than those being farmed. While shellfish aquaculture is often promoted as a source of employment and revenue for small coastal communities, especially First Nations, there are significant obstacles to the geographical dispersion of the industry and a tendency to observe the characteristic post-staples "clustering" of successful enterprises to the exclusion of less-favoured locales. Certainly the model of New Zealand, the global leader in the farming of shellfish species likely to be successful in Canada, suggests a model of concentration and increasing intensity. It is not surprising, then, that both finfish and shellfish aquaculture have proven to be

²⁸ The scope of the BC fishfeed industry (and the contents of fish food) was recently highlighted when Washington State fish farmer found their supplies delayed at the border by the BSE incident, "Canadian BSE case causes fish feed holdups" May 22, 2003, www.intrafish.com (accessed May 23, 2003)

contentious sites of political and policy struggle, existing at the cusp of the transition from a staples (wild-fishery) to post-staples (farmfish) resource sector. In what follows, we focus on the existing mix of policy instruments and prospects for policy change in the less well-known shellfish aquaculture sector, noting where the unique problems of finfish aquaculture would lead to different conclusions.

3. The Existing Canadian Aquaculture Regulatory Framework

The variety of instruments available to policy-makers to address a policy problem is limited only by their imagination. Scholars have made numerous attempts to identify policy instruments and classify them into meaningful categories.²⁹ Unfortunately, many such schemes are either pitched at a very high level of abstraction making them difficult to apply in practical circumstances or dwell on the idiosyncrasies of particular tools, thereby limiting the range of the descriptions and explanations they provide. A scheme that is sufficiently abstract to encompass the various possibilities, yet concrete enough to correspond with the way policy-makers actually interpret their choices, is required.

The origins of such a scheme can be found in Lasswell's insight that rather than face a choice among a huge number of policy tools, governments have developed a limited number of "strategies" which involved "the management of value assets in order to influence outcomes".³⁰ Understanding these basic strategies, and their component instruments, can be accomplished, according to Lasswell, by understanding the resources that governments have at their disposal.³¹

Systematic instrument typologies have emerged by careful analysis of governing "resources". A simple and powerful one has been offered by Christopher Hood who proposed that all policy tools utilized one of four broad categories of governing resources.³² He argued that governments confront public problems through the use of the information in their possession ('nodality'), their legal powers ('authority'), their money ('treasure'), or the formal organizations available to them ('organization') or "NATO". Governments can use these resources to manipulate policy actors by, for example, withdrawing or making available information or money, using their coercive powers to force actors to undertake activities they desire, or simply undertaking the activity themselves using their own personnel and expertise.

²⁹ For a summary of various classification schemes, see Salamon, Lester M. and Michael S. Lund. "The Tools Approach: Basic Analytics." In L. S. Salamon, ed(s), *Beyond Privatization: The Tools of Government Action*, Washington D.C.: Urban Institute, 1989. 23-50 and Salamon, Lester M., ed. *The Tools of Government: A Guide to the New Governance*. New York: Oxford University Press, 2002. See also Lowi, Theodore J. "The State in Politics: The Relation Between Policy and Administration." In R. G. Noll, ed(s), *Regulatory Policy and the Social Sciences*, Berkeley: University of California Press, 1985. 67-105; Bemelmans-Videc, Marie-Louise, Ray C. Rist, and Evert Vedung, ed. *Carrots, Sticks and Sermons: Policy Instruments and Their Evaluation*. New Brunswick: Transaction Publishers, 1998 and Peters, B. Guy and F. K. M. Van Nispen, ed. *Public Policy Instruments : Evaluating the Tools of Public Administration*. New York: Edward Elgar, 1998.

³⁰ Lasswell, Politics: *Who Gets What, When, How*. New York: Meridian, 1958. p. 204

³¹ See also French, John R. P. and Bertram Raven. "The Bases of Social Power." In D. Cartwright, ed(s), *Studies in Social Power*, Ann Arbor: The University of Michigan Press, 1959. 150-167.

³² Hood, Christopher. *The Tools of Government*. Chatham: Chatham House Publishers, 1986. On earlier, or similar, resource-based schemes see Lundquist, Lennart. *Implementation Steering: An Actor-Structure Approach*. Bickley: Chartwell-Bratt, 1987; Anderson, Charles W. *Statecraft: An Introduction to Political Choice and Judgement*. New York: John Wiley and Sons, 1977. and Baldwin, David A. *Economic Statecraft*. Princeton, N. J.: Princeton University Press, 1985.

Using this idea of “statecraft resources”, a basic taxonomy of instrument categories can be set out. Figure 1 below presents such a classification scheme with illustrative examples of the types of policy tools found in each category.

Figure 1. Policy Instruments, by Principal Governing Resource
(Cells provide examples of instruments in each category)

Nodality	Authority	Treasure	Organization
Information Monitoring and Release	Command and Control Regulation	Grants and Loans	Direct Provision of Goods and Services and Public Enterprises
Advice and Exhortation	Self-Regulation	User Charges	Use of Family, Community and Voluntary Organisations
Advertizing	Standard Setting and Delegated Regulation	Taxes and Tax Expenditures	Market Creation
Commissions and Inquiries	Advisory Committees and Consultations	Interest Group Creation and Funding	Government Reorganization

Source: Adapted from Christopher Hood, *The Tools of Government* (Chatham: Chatham House, 1986). 124-125

Inspection of the instruments listed in Figure 1 shows that policy tools tend to fall into two types: *substantive instruments* – like public enterprises or user charges - designed to directly deliver or affect the delivery of goods and services in society; and *procedural instruments* – like the creation of advisory committees and government re-organizations - used to alter aspects of policy deliberations.³³ Early studies of instrument choice tended to focus only upon one type, and to look at instances of single instrument selection. On the basis of numerous such case studies, scholars attempted to discern the general reasons why governments would choose one category of instrument over another. It became quickly evident to investigators, however, that policy sectors and their component programmes tended to involve the use of “bundles” of instruments rather than single tools. Sophisticated students of policy instruments turned their attention to describing these packages of implementation techniques, with the aim of discerning what combinations of instruments were self-reinforcing, which were redundant, and which were actually counter-productive.³⁴

Such studies have generated insights into implementation activities and instrument use which shed light on the possibilities and constraints affecting policy processes and the ability of practitioners to

33 See Howlett, Michael. “Managing the “Hollow State”: Procedural Policy Instruments and Modern Governance.” *Canadian Public Administration*. 43, no. 4 (2000): 412-431. See also Rothmayr, Christine, Uwe Serduelt, and Elisabeth Maurer. *Policy Instruments: An Analytical Category Revised*. Bern: Paper Presented at the ECPR Joint Sessions of Workshops, 27th February-March 4, 1997; and Timmermans, Arco et al. “The Design of Policy Instruments: Perspectives and Concepts.” Chicago: *Midwest Political Science Association* (1998)

34 On optimal mixes see Gunningham, Neil and Darren Sinclair. “Regulatory Pluralism: Designing Policy Mixes for Environmental Protection.” *Law and Policy*. 21, no. 1 (1999): 49-76; Harter, Philip J. and George C. Eads. “Policy Instruments, Institutions and Objectives: An Analytical Framework for Assessing “Alternatives” to Regulation.” *Administrative Law Review*. 37(1985): 221-258; Grabosky, Paul. “Counterproductive Regulation.” *International Journal of the Sociology of Law*. 23(1995): 347-369 and Sterner, Thomas. *Policy Instruments for Environmental and Natural Resource Management*. Washington DC: Resource for the Future Press, 2003.

improve policy implementation.³⁵ While some studies undertaken in this vein have been, and continue to be, influenced by the idea that instrument choices are purely technical in nature, and hence open to rapid change and re-configuration, most studies have linked instrument choices to larger-scale and more permanent arrangements or *implementation styles*.³⁶ In what follows below, the elements of the Canadian shellfish aquaculture implementation style will be set out at both the federal level and for the four provinces most involved in the sector to date; BC, New Brunswick, Nova Scotia and PEI.

3.1. The Federal Situation

The Canadian approach to aquaculture, like the Canadian approach to almost every other policy area, is deeply affected by Canadian federalism. Aquaculture is not mentioned by name in the *Constitution Act (1867)* or in any subsequent *Constitution Act* or amendment. Federal involvement is based directly on jurisdiction over sea coasts and inland fisheries (s. 91(12)), over navigation and shipping, over Indians and land reserved for the Indians and through the federal power to enter into international treaty obligations. Indirectly, federal jurisdiction also derives from federal government activity in the area of environmental protection, and from case law concerning the regulation of international and inter-provincial trade. Finally and more speculatively, the federal declaratory power might be used to bring an aquaculture project or projects under federal jurisdiction and the non-mention of aquaculture might provide grounds for exercise of its residual power over undefined areas. Provincial involvement, on the other hand, is based on constitutionally protected jurisdiction over property and civil rights within the province, over provincial crown lands, over matters of a merely local or private nature within the province, over municipal institutions and over the regulation of lands underlying freshwater lakes, rivers and tidal areas within bays, inlets and estuaries. Provincial jurisdiction also derives from existing provincial activity in the field of environmental protection and from case law supporting provincial rights to implement treaty obligations entered into by the federal government in areas of exclusive provincial jurisdiction. The *Constitution Act (1867)* recognizes a shared jurisdiction over agriculture, which has not, as yet, proved significant for aquaculture policy.

Inevitably, the working out of the complex jurisdictional issues here has involved the usual more or less rancorous series of negotiations punctuated by appeals to the courts. Wildsmith usefully summarizes the outcome as founding Canadian aquaculture policy on the basis of provincial rights to determine how property and resources are used within the province “hemmed in by” the federal power to enact legislation to protect wild fisheries and navigation and shipping.³⁷ A series of early fisheries cases stemming from *The Queen v. Robertson* established that the federal power to legislate under s. 91(12) does not create any proprietary right with respect to a wild fishery and is confined to protection and conservation. There were

³⁵ See Mike D. Young. “Toward Optimal Environmental Policy: The Case of Biodiversity Conservation.” *Ecology Law Quarterly*. 24(1997): 243-298 and Sinclair, Darren. “Self-Regulation Versus Command and Control? Beyond False Dichotomies.” *Law and Policy*. 19, no. 4 (1997): 529-559.

³⁶ Linder, Stephen H. and B. Guy Peters. “The Logic of Public Policy Design: Linking Policy Actors and Plausible Instruments.” *Knowledge in Society*. 4(1991): 125-151.

³⁷ Wildsmith, Bruce H., *Aquaculture: the Legal Framework* (Toronto: Emond Montgomery, 1982):37

early attempts to reconcile the potential conflicts of regulatory authority over aquaculture by negotiated agreement, though no pattern is discernable. The 1912 oyster agreement between BC and the Dominion, for example, delegated the enforcement of federal regulations to the province. The 1936 Mollusc Agreement between Nova Scotia and the Dominion took the opposite tack, delegating the power to grant leases to the federal fisheries minister.³⁸ Thus, some kind of working agreement appears to have been reached during the early years of aquaculture on the understanding that federal provincial cooperation was essential if Canadian aquaculture was not to be strangled at birth but the nature of the agreement was the product of local circumstances.

In practice, this jurisdictional tangle that resulted has proved a considerable obstacle to the sustainable development of the aquaculture industry. While the industry has complained about the added cost of regulatory overlap and duplication, federal-provincial blame-avoidance strategies have contributed to a dangerous vacuum in addressing the potential social and environmental impacts of the industry. Recognizing the jurisdictional difficulties that the nascent industry faced, when aquaculture entered into its modern period of rapid expansion in the 1980s an attempt was made to tackle the problem within the prevailing model of intergovernmental federalism. The First Ministers issued a statement of national goals and principles for aquaculture at their meeting in 1986. The statement was followed by a series of Memoranda of Understanding between the provinces and Ottawa that attempted to provide the basis of a working relationship between the two levels of government tailored to the circumstances of each province. These MOU's superseded the previous patchwork of agreements and delineated agreed upon areas of exclusive jurisdiction and areas for intergovernmental cooperation. While there was a certain amount of learned debate about the legal status of the MOU's at the time³⁹, and environmental organizations have periodically made noises about testing what they see as an unconstitutional delegation of powers from (environmentally friendly) federal to (industry-dominated) provincial governments in violation of the basic scheme of ss. 91 and 92 of *Constitution Act*, there have been no cases to date.

In 1984, the federal government designated the Department of Fisheries and Oceans (DFO) as the lead agency for aquaculture. While this move clarified the lines of responsibility in the federal government⁴⁰ it was not without its drawbacks. As critics of DFO's role in aquaculture development continue to complain, it placed aquaculture within a ministry that had strong historical links with capture fisheries and long-established connections with fisheries clients on both coasts. Moreover, it effectively foreclosed the debate about whether aquaculture was more appropriately understood as a kind of farming, to which an agricultural rather than a fisheries model of regulation could be applied. Although the MOU's in most provinces gave provincial agencies control over site selection; over lease or licence approval, including the terms and conditions attached to leases and licenses; and over most operational aspects of fish

³⁸ Wildsmith, 75-6, 165; Richard W. Parisien, The Fisheries Act: Origins of Federal Delegation of Administrative Jurisdiction to the Provinces, Environment Canada, May 1972

³⁹ British Columbia, Ministry of Agriculture and Fisheries, Aquaculture Legislation in British Columbia: A Comparative Legal Analysis, Aquaculture Industry Development Report 91-01. Victoria, 1991, pp. 19-21

⁴⁰ It is often claimed that there are at least 17 federal departments and agencies with a finger in the aquaculture pie. In fact, from a regulatory point of view in shellfish aquaculture, there are just three key departments, DFO, Environment Canada, and the Canadian Food Inspection Agency.

farms, DFO exerts a powerful influence at a distance over many of these decisions. More significantly still, DFO exerts this influence through two older pieces of classic “command and control” legislation, the *Fisheries Act* and the *Navigable Waters Protection Act (NWPA)*. Depending on the nature of the process for inter-agency referrals developed in each of province, where there is the possibility of harmful alteration, disruption or destruction of fish habitat DFO has significant ability to deny or require modification of proposals for new or amended leases and licences under s 35 of the *Fisheries Act* . Together with the provision of the *NWPA* that triggers an environmental assessment under the *Canadian Environmental Assessment Act* where a “work” may be a significant hazard to navigation, the ability of DFO to cause delays in the approvals process has been a significant irritant to the industry and has resulted in calls for a “single window, one-stop shopping” approach. At the operational level, the potential for some fish farming practices to fall under s. 36 of the Fisheries Act, “the deposition of deleterious substances into waters frequented by fish”, and the regulatory regimes surrounding the capture and movement of seed stocks and the movement of new species such as abalone have also caused problems. As is common in Canadian environmental statutes, both ss. 35 and 36 of the Fisheries Act are written to allow extensive administrative discretion and the lack of transparency in the exercise of this discretion is often at issue.⁴¹

Concerns about the regulatory regime surrounding sanitation and food safety tend to be rather different. Federal activity in this area centers on the Canadian Shellfish Sanitation Program (CSSP) jointly administered by DFO, the Canadian Food Inspection Agency and Environment Canada under the authority of the Fisheries Act, Management of Contaminated Fisheries Regulations, the Fish Inspection Act, and Fish Inspection Regulations. The CSSP is a comprehensive program of water quality monitoring, and control of harvesting, processing and movement of shellfish destined for human consumption. Again, the regime is of the traditional command control type. Under an agreement dating back to 1948 the regulations are closely coordinated with those of the major export market, the American National Shellfish Sanitation Program guidelines. Three sets of issues have surfaced with respect to CSSP. The first centres on the cost of administering the program in light of industry expansion into new areas where water quality monitoring will have to be undertaken. The federal government has responded to these concerns by including new money for water quality monitoring in the Program for Sustainable Aquaculture announced in 2000, but there has also been interest in private public partnerships to extend the reach of the program. Equally seriously, we have seen the beginning of new environmental concerns that the CSSP monitors for a restricted range of contaminants, largely those of bacteriological origin at the expense of other hazardous materials such as heavy metals and dioxins. Finally, there is the issue of the appropriateness of this regulatory regime as a means of realizing the larger objective of improving water quality and protecting those shellfish farming areas, often the most accessible for markets and transportation links, that are most at risk from human and agricultural sources of contamination. In Atlantic Canada, roughly one third of the

⁴¹ Both sections contain provisions for habitat to be harmed or deleterious substances to be discharged by Regulation or by Ministerial Order (Fisheries Act RSC ss. 35 (2), 36(4),(5),(6)), creating the possibility for a classic “permitting” regime as has been proposed by the Commissioner for Aquaculture Development: “By providing clear and transparent standards, regulations under section 36 could give confidence to stakeholders that environmental interactions are managed. (Reg Review p. 23)

area classified as suitable for shellfish growing is currently closed due to contamination and in BC, the proportion may be even higher.⁴²

The peculiarity of the regulatory framework at the federal level is clear. Although the main objective of post-1980 federal policy is undoubtedly the development of the industry, the principal regulatory instruments and the mandate of the lead agency supposedly charged with implementing the policy are both designed to protect the wild fisheries and other water users from negative impacts by aquaculturalists. Moreover, neither the mandate itself nor the peculiar nature of the instruments used to carry it out is the contingent outcome of policy choices that could easily be reversed. Both are in fact based on the constitutional division of powers and reflect the limit of federal jurisdiction to what Wildsmith so aptly calls the “hemming in” of provincial jurisdiction over the property and resources used for fish farming. From the beginning, then, the modern regulatory regime had to be complemented by subsidy and expenditure instruments. These included the development and continuing support of an aquaculture research capacity in DFO and Canadian universities, a variety of federal tax incentives for farming and small business, the extension of farm credit facilities to fish farmers, and various targeted expenditures through the regional development agencies, currently ACOA and, to a lesser extent, WED. Nonetheless, supporters of aquaculture development have continued to look enviously at the substantial subsidies enjoyed by Canadian farmers, keeping alive the agricultural model for aquaculture regulation. As the federal Commissioner for Aquaculture Development has argued, while the resolution of the regulatory issues will provide some support to the industry, “the federal government should also analyze the appropriateness of other measures to ensure that aquaculture and other food sectors in Canada operate on a level playing field.”⁴³ He noted especially the various kinds of income support and stabilization programs, including crop insurance, enjoyed by terrestrial farmers but not by their marine counterparts.

Procedurally, a different set of instruments has been used. At the intergovernmental level, coordination of aquaculture policy between the federal and provincial governments is handled by intergovernmental negotiation. To that end, after their discussion of aquaculture at the First Ministers’ Conference in 1986, governments pursued aquaculture policy issues through the Canadian Council of Fisheries Ministers, later renamed the Canadian Council of Fisheries and Aquaculture Ministers (CCFAM). CCFAM was responsible for the negotiation of the Agreement on Interjurisdictional Cooperation With Respect to Fisheries and Aquaculture in 1999 and subsequently created the Aquaculture Task Group (ATG), to work on aquaculture policy-related issues.⁴⁴ Among the network management projects recently completed by the ATG is the Canadian Action Plan for Aquaculture. It was envisaged as a mechanism that “would be a means of organizing information, linking activities, be cohesive and provide a measuring tool for achievement of objectives. The Plan would be high level and set the broad pan-Canadian direction but

⁴² For Atlantic Canada, see the CSSP site, <http://www.ns.ec.gc.ca/epb/sfish/cssp.html> (visited April 12, 2003); for BC personal communication.

⁴³ OCAD Reg Review, p 20

⁴⁴ Vanderzwaag, David, Gloria Chao and Mark Covan, “Canadian Aquaculture and the Principles of Sustainable Development: Gauging the Law and Policy Tides and Charting a Course” presented at the AquaNet Law and Policy Workshop, Halifax, February 2003: 22

be implemented by each jurisdiction according to their specific circumstances.”⁴⁵ The development of a national industry organization, the Canadian Aquaculture Industry Alliance (CAIA), formed in 1995 and a member of the Alliance of Sector Councils, has complemented these efforts at network management on the industry side.

These traditional Canadian tools of federal-provincial network management were accompanied by some relatively minor departmental reorganization. Concerns about the capture-fishery culture within DFO, led to the creation of the Office of the Commissioner for Aquaculture Development (OCAD) reporting directly to the fisheries minister, intended to act as a “champion” for the development of the industry. DFO also underwent a minor reorganization, creating an Office of Sustainable Aquaculture. Some evidence of subsystem spillover, once again from agriculture, has been in the creation of the Canadian Food Inspection Agency in response to public concerns about food safety and the cozy relationship between regulators and (terrestrial) farmers.

Information instruments have been used sparingly at the federal level, and, where they have been used, finfish aquaculture has been in the spotlight. Aquaculture was the object of an investigation by the Senate Standing Committee on Fisheries, which took submissions, held public hearings and published a report in June 2001. DFO had a similar consultative process before issuing its Aquaculture Policy Framework. Calls for a Royal Commission, directed largely at issues arising from finfish aquaculture, have fallen on deaf ears.

3.2. British Columbia

At the provincial level, in British Columbia, cultivation of the native oyster (*Ostrea lurida*) was an outgrowth of the original natural fishery, which had been seriously overexploited during the 1930s. However, slow growth rates and high mortality associated with native oyster culture and similar efforts to farm the eastern oyster (*Crassostrea virginica*), led to an industry based almost exclusively on the Japanese oyster (*C. gigas*), introduced into BC around 1912. Spat was originally brought from Japan, but *C. gigas* soon naturalized in the Strait of Georgia. Pendrell Sound was reserved as a seed-producing area by Order in Council under the provincial *Land Act* as early as 1950. Farming of other species was slow to develop, but by the late 1980s overexploitation of the clam fishery and advantageous clam prices led to experiments with clam aquaculture, often on oyster leases, and to the development of significant farmed clam output. In recent years, scallop farming in waters too cold for other species and experiments with potentially valuable new species such as mussels, abalone and sea urchins have extended the scale and variety of the industry. In 2001, BC produced 8.8 million tonnes of farmed shellfish with a wholesale value of \$26m (up from 6.6 million tonnes worth \$12 million in 1996). By contrast, wild shellfish landings in 2001 were recorded at 19.8 million tonnes with a wholesale value of \$186 m.

⁴⁵ Record of Decision, CCFAM Aquaculture Task Group, Toronto, 2001, available online at http://www.aquaculture.ca/English/CCFAM/CAIA_RecordsOf10.html.

Early aquaculture regulatory activity was largely driven by public health and food safety considerations. Sanitary regulations were introduced in 1949 but were unable to prevent several outbreaks of paralytic shellfish poisoning (PSP) leading to closures and restrictions. Between 1964 and 1995 the province operated a Shellfish Marketing Board in cooperation with the BC Oyster Growers Association in an effort to maintain public confidence in the industry. Oyster growers were given access to the Crown foreshore through a system of leases and licenses (for many decades administered by the Ministry of Forests and Lands), with the usual discretionary powers for the Minister to impose terms and conditions upon and to require certain performances from leaseholders and licensees. Meanwhile, farmers' activities were regulated by the provincial *Fisheries Act* and its accompanying regulations (in addition to the regime established by the federal *Fisheries Act* and its regulations). The regulations sought to control the importation of oysters into the province and the movement and sale of oysters harvested from contaminated beaches, setting up a registration scheme for all shellfish farmers and imposing some basic harvest reporting requirements. Aquaculturalists were also designated "farmers" for provincial taxation purposes and entitled to a variety of tax exemptions and deductions.

Beginning in the 1980's, promotion of aquaculture became the responsibility of the Ministry of Agriculture and Fisheries (later Agriculture, Food and Fisheries [MAFF]), which was identified as the lead agency "to develop aquaculture into an important food-producing enterprise in British Columbia.". The province has made extensive use of financial instruments, including an Aquaculture Incentive Program and a variety of other credits and incentives related to farming and small business. In common with other provinces, BC negotiated a memorandum of understanding (MOU) with the federal government in 1988 that aims to clarify the relationship between the two levels of government with respect to aquaculture and promote the orderly development of the industry. Under the BC MOU, the federal government retains responsibility for the protection and conservation of wild stocks, the protection of navigable waters, the permitting regime for the collection of wild stock and spat, and sanitary requirements. The province retains control over licensing, the management of the industry, the size and location of facilities, and industry practices.

Nonetheless, BC remains unusual amongst the coastal provinces in that it has no *Aquaculture Act* or other kind of consolidation. Consequently, the BC regulatory framework is a patchwork of old and new regulations. Thus environmental impacts are largely addressed through the *Waste Management Act*, another traditional regulatory instrument enforced by inspectors from the Ministry of Water, Land and Air Protection, and key social issues, such as noise, odour, lights and hours of operation are addressed as matters of worker safety or as the subject of municipal zoning and bylaws, potentially in conflict with provincial regulations. The major initiative in this respect has been the draft industry Code of Practice (COP). Developed in close consultation with industry, the COP was intended to be a new instrument of coregulation. Largely descriptive and lacking any performance standards, the draft COP was essentially a statement of current best practices in which the agricultural model of aquaculture regulation resurfaced. Complaints about fish farm practices would be directed to the Farm Practice Review Board created under

the Farm Practices Protection (Right to Farm) Act, where the COP could be used as a guide to a “normal farming practice”.⁴⁶

The principal instrument of subsidy at the provincial level was the Shellfish Aquaculture Working Capital Fund, created to provide loans of up to \$30,000 or 65% of total project costs and intended to address the chronic shortage of working capital in the industry. BC was already distinct from the Atlantic Provinces in that, although a wide range of support programs is available, the Fund was the only example of a BC aquaculture production support initiative focused on providing direct support for individual entrepreneurs.⁴⁷

While issues of intergovernmental and interagency coordination surfaced during the debate about how to expand clam culture in the early 1990's,⁴⁸ it was not until 1998 that the province launched its belated effort to expand the industry by making additional areas available for tenure. The Shellfish Development Initiative undertaken at that time revealed the drawbacks of the patchwork of old regulatory rules and new financial initiatives and forced them onto the policy agenda. From the industry point of view, the tenure approval process was painfully slow, with the *NWPA/CEAA* roadblock a particular source of irritation. In the larger picture, the expansion into new areas on the west and north coast of Vancouver Island and the mainland central and north coast, brought many additional players and problems to the table, involving First Nations claims, high costs, poor transportation links and processing infrastructure, and new water monitoring programs. The government was caught by surprise not only by these events, but also by the hostility of communities to the expansion and intensification of fish farming in areas where leases had traditionally been concentrated.

While MAFF is the designated lead agency for shellfish aquaculture, the Ministry of Sustainable Resource Management (MSRM) is responsible for coastal planning, the Ministry of Water, Land and Air Protection (WALP) is responsible for enforcement of a number of key provincial regulations that affect aquaculture, including the *Waste Management Act*, and Land and Water BC is responsible for tenure applications. Interministerial coordination is handled at the operational level by the Directors of Aquaculture Committee (DAC), which includes DFO representation.

Other than these rather primitive efforts at network management, the main procedural instrument has been public involvement. Shellfish farmers must have the permission of adjacent upland owners to carry on their operations on the foreshore and near shore and may not block an upland owner's water access. However, the *Land Act* allows any individual to object to a tenure application, although the decision whether to hold a hearing and the final decision remain at the discretion of the Minister. Directive 99-10-01, which was intended to lay the procedural ground rules for the expansion of tenures, envisaged a more open participatory process of community consultation directed by Community Shellfish Steering

⁴⁶ <http://www.agf.gov.bc.ca/fisheries/Shellfish/cop.htm>

⁴⁷ Canada, Office of the Commissioner for Aquaculture Development, Review of Provincial and Territorial Services and Program (sic) in the Aquaculture Sector, p. 3 online at http://ocad-bcda.gc.ca/Study%20of%20PDF%20Review%20of%20Prov%20P&S_English.pdf

⁴⁸ British Columbia, Ministry of Agriculture and Fisheries, Proceedings of the 1990 Manila Clam Workshop. Aquaculture Industry Development Report, 90-09. Victoria, 1990, pp 2-3

Committees. In the event, it proved impossible to work with many of these committees, in some cases even impossible to strike them, and they were quietly dropped from the tenure expansion process. MSRM took over the public consultation, facilitating intensive local planning focused on shellfish for high interest, high conflict areas and subsuming shellfish farm planning into the larger framework of coastal planning elsewhere. The Baynes Sound Management Plan provides an example of the former process, the Nootka Coastal Land Use Plan an example of the latter.

3.3 .New Brunswick

On the east coast, New Brunswick has had an oyster industry for over a century. Public oysters beds were decimated by Malpeque disease in the 1950s and landings dropped from 3,594 tons in 1949 to only 2.7 tons by 1960.⁴⁹ The industry was revitalized by the 1989 Canada-New Brunswick MOU and oyster farms now report landings of 120-160 tons annually. In 2000 there were 1,593 licences in the eastern New Brunswick area as well as clams in the southwestern area. Total economic value was estimated at \$88 million (average 1995-1997), with total employment at 2,048.⁵⁰

The industry has been heavily promoted in recent years. Development funds such as the Regional Economic Development Agreement (REDA), a federal/provincial development agreement signed July 31, 1996, covered the implementation of projects in several industrial sectors including fisheries and aquaculture. This agreement was designed to provide funding for federal and provincial department and non-commercial Crown corporations to support economic development initiatives. In 1998-1999, the Department of Fisheries and Aquaculture received a total of \$ 1.6 million from this agreement to implement 42 projects. The aquaculture sector received funding for a number of initiatives including the development of alternate shellfish and finfish species for culture in New Brunswick coastal waters, the development of arctic charr and rainbow trout broodstock for inland culture, fish health services, and research and development initiatives relating to the ISA virus. The processing and marketing sector received funds to support promotional activities, to develop value-added seafood products and new packaging, and to further expand existing and new seafood initiatives.

The Economic Development Fund (EDF) was a four-year provincial funding program that came into effect April 1, 1996 following the elimination of the sectoral agreements funded by the federal and provincial governments and the reduction of federal funding for cost-shared agreements. The purpose of the fund is to contribute to high-priority development projects that cannot be funded through departmental budgets or under REDA. In 1998-1999, the Department of Fisheries and Aquaculture was allocated \$850,000 for activities in the aquaculture and harvesting sectors. Each sector benefited from approximately

⁴⁹ Canada, Integrated Commercial Oyster Fishery Management Plan: Eastern New Brunswick Area – Gulf Region Re 2110-2006 (Ottawa: DFO, 2002) at URL [http://www.glf.dfo-mpo.gc.ca/fm-gp/mgmt-\[:an/nb-nb/oyster_huitre_2001_2006-e.html](http://www.glf.dfo-mpo.gc.ca/fm-gp/mgmt-[:an/nb-nb/oyster_huitre_2001_2006-e.html)

⁵⁰ Maurice Mandale, Michael e. Foster, P. Y. Chiasson, The Economic Value of Marine-Related Resources in New Brunswick (Fredericton: New Brunswick Department of Fisheries and Aquaculture and DFO, May 2000)

50 percent of the allocated budget. The aquaculture sector received funding for its freshwater finfish and coastal shellfish development activities.

The Strategic Development Fund (SDF) is another provincial funding program that was initiated in 1994 by the Department of Fisheries and Aquaculture. The objective of this program is to promote the implementation of special and pre-commercial projects and to provide the support essential to a sustainable, competitive and diversified fishing and aquaculture industry. The budget for 1998-1999 was \$1.5 million. Aquaculture, processing and marketing, and harvesting initiatives were funded under this program during the fiscal year. The aquaculture sector received funding to support 43 projects. They included a number of studies, disease investigation and monitoring activities, information workshops, development activities, new species development initiatives and industry missions to visit other aquaculture facilities.⁵¹

Procedurally, the New Brunswick Ministry of Agriculture, Fisheries and Aquaculture is actively involved in promoting the industry but met infrequently with organized aquaculture associations and NGOs until recently. As part of the Bay of Fundy Shellfish Management Plan it was very active recently along with the South-west Clam Resource Committee and the New Brunswick Provincial Shellfish Working Group in allocating licences and dealing with problems in those areas.⁵²

3.4. Nova Scotia

Also on the east coast, the province of Nova Scotia followed the typical pattern of large-scale promotion of increased aquacultural activity after 1984. The Nova Scotia shellfish industry is composed of the harvesting of four primary species: blue mussels, sea scallops, American oysters and European Oysters. The industry is relatively small, with net production valued at \$5.1 million in 2000, representing 10% of net sales of aquacultural products in Nova Scotia.⁵³ Total employment in this sector is 155 full time employees, 311 seasonal workers, and 153 part-time workers.⁵⁴

In 1996, the Government of Nova Scotia undertook a major reorganization to consolidate and revise the laws respecting the fishing industry generally, with ramifications on the aquaculture industry. A comprehensive study, entitled The Nova Scotia Fisheries and Coastal Resources Act: Discussion Draft, served as the basis for the changed statutes.

Stemming from the discussion paper, Nova Scotia passed the Fisheries and Coastal Resources Act. The FCRA consolidated legislation concerning fisheries, aquaculture development, sea plant harvesting from nine separate acts into one.⁵⁵ The Act establishes not only establishes the site requirements, harvesting and handling requirements for the industry, but also actively promotes fish farming as an industry subject to

⁵¹ Fisheries and Aquaculture New Brunswick, Annual Report 1998-1999 (Fredericton: Communications New Brunswick, 1999)

⁵² New Brunswick Ministry of Agriculture, Fisheries and Aquaculture, Annual Report 2001-2002 (Fredericton, N.B. Ministry of Agriculture, Fisheries and Aquaculture, 2002)

⁵³ Nova Scotia, Department of Agriculture and Fisheries, Statistics: Aquaculture Production Sales of Market Sized Products, <http://www.gov.ns.ca/nsaf/aquaculture/stats/2000.htm>.

⁵⁴ Nova Scotia, Department of Agriculture and Fisheries, Statistics: Aquaculture Employment Statistics for 2000, <http://www.gov.ns.ca/nsaf/aquaculture/stats/es00.htm>.

⁵⁵ Fisheries and Coastal Resource Act, Section 125 repealed the following Acts: Aquaculture Act; Fisheries Act; Fisheries Development Act; Fishermen's Associations Act; Irish Moss Act; Nova Scotia Fish Inspection Act; Oyster Fisheries Act; Salt Fish Marketing Act; Sea Plants Harvesting Act

government subsidies. Regulations relative to the fish industry include the *Aquaculture Licence and Lease Regulations*, the *Buyer's Licensing and Enforcement Regulations*, the *Fish Inspection Regulations*, and the *Fisheries and Aquaculture Loan Regulations*.

Two programs in particular are of interest in that they indicate the apparent willingness of the Nova Scotia government to expand this industry. First, the *Fisheries and Aquaculture Loan Regulations* specify that interested and qualified parties may be eligible for assistance for the purchasing of equipment for a start-up or continuing aquaculture commercial enterprise. Second, in conjunction with Human Resource Development Canada, the Nova Scotia Department of Fisheries and Agriculture, developed a ten week classroom course to promote and teach prospective students how to establish and run a aquaculture business through the Nova Scotia Agricultural College.⁵⁶ Additionally, the Department of Fisheries and Agriculture lists 10 other possible sources for financial assistance for those looking to get into, or expand their operations.

However, like other jurisdictions, legislation and regulations concerning the mariculture industry still remains smattered across other departments and agencies. The Assessment Act defines aquacultural property as 'resource property,' for taxation purposes. The Wilderness Protection Act, explicitly prohibits aquacultural activities in areas defined as a 'wilderness area,' unless exempted by the Minister. The Environment Act and its associated regulations *Activities Designation Regulations*, and the *Environmental Assessment Regulations* also govern activities relating to the shellfish industry. The *Activities Designation Regulation* requires prospective shellfish farmers to obtain ministerial approval before commencing with the development of a commercial enterprise that would use water or alter a water-course. The *Environmental Assessment Regulations* spell out when an environmental assessment (and subsequent report) must be carried out, along with public consultations, and the criteria for a positive environmental assessment. With respect to aquaculture, an environmental assessment is not a mandatory requirement; that is, no act directly specifies that an aquaculture operation must have a positive environmental assessment in order to be approved. However, a positive assessment is one possible criteria used to determine the issuance of an aquaculture lease.

The most sophisticated efforts to use procedural instruments to cope with existing and emerging problems have been in Nova Scotia. In an effort to facilitate economic development while simultaneously providing information to the local residents and determining the level of public support, the government recently initiated the concept of community-based review. The Nova Scotia Aquaculture Development Committee was formed in November 1993 as a joint initiative by the Nova Scotia Department of Agriculture and Fisheries (NSDAF) and the Nova Scotia Economic Renewal Agency to combine the overall capabilities of any government agencies that could contribute to the promotion and development of Aquaculture in Nova Scotia.

The committee is chaired by NSDAF and consists of members representing a diverse mix of government departments and agencies who have regulatory, development, research and potential funding

⁵⁶ See Nova Scotia Agricultural College, Aquaculture Centre, <http://www.nsac.ns.ca/pas/Aqua/aquaculture.htm>

involvements regarding aquaculture. The committee provides a vehicle for enhanced, efficient communication and eliminates duplication of effort on aquaculture issues and projects that involve more than one agency. It also serves to inform agency members of respective current involvements with aquaculture to increase overall awareness and dissemination of aquaculture related information and activities. Agencies currently represented on the N.S.A.D.C. are: N.S. Dept. of Agriculture and Fisheries; Dept. of Fisheries and Oceans; National Research Council (IRAP); NS Dept. Economic Development; Canadian Coast Guard; Human Resource Development Canada; Federal Business Development Bank Canada; ACOA; Sustainable Economic Development; Industry Canada; Environment Canada; Farm Credit Corporation; Aquaculture Assoc. of N.S. Enterprise Cape Breton; and the National Research Council (IMB)

The committee is serviced by technical sub-committees composed of qualified experts from federal and provincial agencies or appropriate industry associations. The committees review Aquaculture applications, F.L.B. loan requests and agency funding proposals from a technical and financial perspective and report results through the N.S.A.D.C. to the appropriate agency. Federal/Provincial Co-op agreement projects are also reviewed through these committees. In addition the committees provide advice, comments, and recommendations on major issues, potential policy, programming and future research efforts from various sources when requested.

There are currently three subcommittees operating under the aegis of the N.S.A.D.C. All have developed terms of reference and criteria that govern their review function. The Shellfish and Salmonid Finfish technical subcommittees meet on all issues and applications regarding traditional aquaculture species including new growout ones, U-fish operations hatcheries and introduction and transfer issues regarding new species. The Experimental Marine Finfish subcommittee was formed most recently to deal with growing interest and preliminary development issues of hatchery and grow out culture of marine whitefish species, striped bass and eels. Culture of traditional highly valued species such as halibut, haddock, and flounder are at or near commercial development in Europe and offer significant potential for N.S. over the long term. The immediate mandate of this subcommittee is to provide orderly guidance during the critical early development stages of this type of aquaculture. The technical subcommittees also consider any potentially new or existing technologies or techniques that may benefit industry in the future. Examples would include enhanced triploid (breeding) techniques, cryopreservation of shellfish larvae, broodstock development, fish health, disease control, carrying capacity and planning for currently active areas. Funding agency representatives sit on all technical committees and provide assessment and input regarding business aspects of Aquaculture applications in addition to providing review of any major research proposals and loan requests submitted. The N.S.A.D.C. currently meets quarterly or as required. The committee has overseen review of approximately 160 applications and 40 proposals over the past 3 years as part of routine business.

In addition the committee has and will continue to identify and address fundamental weaknesses in the existing infrastructure vital to substantial growth and development of the Aquaculture industry in

Nova Scotia. Specific efforts have been undertaken by the committee to investigate major issues by meeting with outside groups to solicit advice and information. Meetings have been held with chartered bank representatives to review and discuss past problems and potential solutions regarding sources of working capital from private sector sources. A key government representative from N.B. was invited to present the strategy that has resulted in the successful industry in N.B., and how elements of this strategy could be utilized to assist the industry in N.S. The committee has also met at the N.S. Agricultural College and Department of Agriculture and Fisheries to tour the facilities and discuss the expertise and capabilities that may be applied to Aquaculture development.

The committee has met with representatives of A.C.O.A. Cape Breton and toured one of the major integrated salmon and trout producing facilities in the area to better understand the problems and potential opportunities present in that substantial segment of the Aquaculture industry. When required, the committee has previously examined major initiatives supported and promoted by community level based organizations in Richmond and Digby counties to assist and facilitate achievement of their objectives regarding aquaculture, and stands ready to assist other areas if the need arises.⁵⁷

Regional aquaculture advisory committees have also been created recently and have been given greater powers as to who is awarded licenses. Regional Aquaculture Development Advisory Committees (RADACs) began with a pilot project in the Wedgeport and Pubnico area. The strategy behind such an approach was to obtain a vehicle whereby the developer and the community come to an agreement on the best way to proceed. The result of this process is then passed on to the Minister of Fisheries and Aquaculture as a recommendation. The RADACs are composed of people who represent the interests of the area. This may include fishermen, aquaculturists, recreational boaters, waterfront landowners, business operators and local politicians — in short, people and groups affected by the installation of an Aquaculture site. Currently there are RADACs in operation in Digby/Annapolis, Wedgeport, Pubnico, Shelburne, Mahone Bay, the Eastern Shore, Guysborough, Isle Madame, Tatamagouche and East St. Margarets Bay. The government hopes that most areas with significant potential for Aquaculture development will form community RADACs. Areas not covered by a RADAC will have input through public hearing processes.⁵⁸

3.5. Prince Edward Island

Finally, in Canada's smallest province, Prince Edward Island, there has been long-established oyster fishery on tidal rivers. In 2000 there were 909 contaminated commercial oyster license holders and 1077 commercial license holders in the clean water fall fishery.⁵⁹ 1999 landings were 3.2 million kg, valued at \$6.9 million. PEI is very much an anomalous case in Canadian shellfish aquaculture, however, as its MOU agreement with the federal government specifies that most aspects of provincial regulation will be administered by the federal government under the terms of the federal regulatory regime.

⁵⁷ <http://www.gov.ns.ca/nsaf/aquaculture/nsadc/index.htm>

⁵⁸ <http://www.gov.ns.ca/nsaf/aquaculture/radac/index.htm>

⁵⁹ See Ottawa, Integrated Fisheries Management Plan: Oysters – Prince Edward Island 2000-2004 (Inclusive) (Ottawa, DFO, 2000) at URL http://www.glf.dfo-mpo.gc.ca/fm-gp/mgmt-plan/pei-ipe/oysters_huitres_2000_2004-e.html

In PEI the Prince Edward Island Shellfish Advisory Committee⁶⁰ deals with many aspects of the oyster fishery. Chaired by DFO it only meets as issues come up which need industry feedback. It is composed of representatives from commercial oyster fishermen, DFO research management conservation and protection and science branch, provincial fisheries and members of aboriginal communities. Three key advisory committees also operate in this sector. The first is the Sea Duck Mussel Aquaculture Working Group created in the mid-1990s. This Committee examines the issue of interaction of sea ducks and mussel sites. Outcomes can be research, technology development and communications. It involves participants from the federal and provincial government and industry. A second is the Shellfish Classification Working Group. This group involves federal, provincial and industry representatives and examines and makes recommendations on water quality issues - particularly bacterial contamination in shellfish areas that may result in shellfish closures. This group has been in existence for more than 10 years.

A PEI Aquaculture Committee was also recently established. It is made up of high-level (Deputy-Minister and Regional Director) federal, provincial and industry representatives. This committee examines constraints and opportunities in relation to aquaculture. In terms of DFO locally there are two important committees, the Aquaculture Lease Management Board and the Lease Referral Committee that gave advice to DFO on matters relating to aquaculture leasing.⁶¹

4.0 Aquaculture Development: A Research Agenda

Even after discounting some of the hyperbole surrounding industry growth forecasts, it is clear that farm-raised seafood will become an increasingly important component of the Canadian resource economy. The combination of Canada's extensive coastline and its proximity to US consumers is an irresistible attraction to investment in the industry, as the recent history of multinational involvement in BC salmon farming underlines. As this overview has shown, Canada's aquaculture implementation style, with its traditional mixture of regulation and subsidy overseen by industry advisory groups in a clientelist relationship with pro-development provincial government agencies, is ill adapted to managed the challenges of steering aquaculture through the complexities of a post-staples economy. Compounding the problem is a significant policy legacy, the constitutional division of powers and subsequent case law around jurisdiction over fisheries combined with the decision to treat aquaculture as a species of fishery, including the nomination of DFO as the lead federal agency.

As in many other natural resource sectors, the preferred substantive instrument in aquaculture policy has historically been regulation augmented, especially after 1984, with extensive use of another

⁶⁰ See Ottawa, Integrated Fisheries Management Plan: Oysters – Prince Edward Island 2000-2004 (Inclusive) (Ottawa, DFO, 2000) at URL http://www.glf.dfo-mpo.gc.ca/fm-gp/mgmt-plan/pei-ipe/oysters_huitres_2000_2004-e.html

⁶¹ Interviews with provincial aquaculture officials

category of substantive instrument, financial incentives.⁶² Recently, there has been a number of initiatives that suggest at least the outlines of a more sophisticated approach, better adapted to the context of a post-staples economy. At the federal level, the passage of the *Oceans Act* and the development of Canada's Oceans Strategy has potentially wide-reaching consequences for aquaculture. Some of these consequences are evident in the federal Aquaculture Policy Framework, including a commitment to improve network governance and a shift towards ecosystem- rather than resource-based management. The provinces have to some extent followed developments at the federal level, experimenting with industry self-regulation and encouraging adherence to voluntary codes of conduct and eco-certification.⁶³ As we would expect from the literature on incentive-based regulation, movement in this direction faces many obstacles and has not proceeded very far.⁶⁴ In spite of the commitment to improve network governance and various efforts to involve new stakeholders, the use of industry advisory committees continues to be the predominant procedural technique of governance in this sector.

This regime of aquaculture policy development and implementation in Canada, put into place over the past two decades, faces two major problems corresponding to the two sides of the same vise that is squeezing most resource industries in the post-staples economy. On one side, aquaculture, particularly salmon farming, faces intense competition from low-cost producers who are treating the product as a traditional staple. On the other, the aquaculture industry faces equally intense pressure as a result of its location in a rapidly diversifying rural economy, with many competing uses in the coastal zone. As a result the industry is receiving attention not just from the metropolitan environmental movement but also from significant interests in its own backyard: fishers, First Nations, the recreation and tourism industry and "lifestyle" landowners. Easing off the vise and reducing the pressure means policy change addressed to both sides of the equation. The European "Label Rouge" scheme for farmed salmon and the successful campaign by the New Zealand shellfish industry to identify the greenshell mussel as a higher-value product are examples of marketing exercises being carefully followed in Canada, though the former seems to be encountering some predictable consumer resistance in its toughest market.⁶⁵ On the other side, the salmon farming industry is already fighting an uphill battle against a perception that it is a dirty industry of last resort, suitable only for coastal communities without any other prospects of survival, the maritime equivalent of hog farming. Shellfish farms will have to move quickly to avoid the same fate. What is the role of public policy in slacking off the vise and what are the prospects for success?

62 Bohm, Peter and Clifford S. Russell. "Comparative Analysis of Alternative Policy Instruments." In A. V. Kneese and J. L. Sweeney, ed(s), *Handbook of Natural Resource and Energy Economics - Volume I*, Dordrecht: Elsevier, 1985.

63 See, e.g. "Stolt Sea Farms achieves ISO 14001 certification", April 11, 2003, www.intrafish.com (accessed May 23, 2003).

64 Gunningham, Neil and Joseph Rees. "Industry Self-Regulation: An Institutional Perspective." *Law and Policy*, 19, no. 4 (1997): 363-414; Grabosky, Peter N. "Using Non-Governmental Resources to Foster Regulatory Compliance." *Governance*, 8, no. 4 (1995): 527-550 and Grabosky, P.N. "Regulation by Reward: On the Use of Incentives as Regulatory Instruments." *Law and Policy*, 17, no. 3 (1995): 257-282.

65 "French consumer test finds Scottish Label Rouge salmon fattier and less 'tasty'", May 22, 2003, www.intrafish.com (accessed May 23, 2003).

On the value-added side, the picture is mixed. The retreat of the Canadian state from any kind of industrial policy over the last twenty years and its consequences has been well documented.⁶⁶ The alternative route to restructuring is perhaps best illustrated by the forest industry in BC. As Roger Hayter has argued, the last provincial government tried to nudge the industry towards more technologically sophisticated value-added production by increasing the costs of industry access to the (Crown-owned) resource and by encouraging enrolment in self-regulatory schemes against a general backdrop of environmental re-regulation.⁶⁷ As the forestry case illustrates, even with provincial control over lease and licence charges, getting the incentive structure right is no easy task. For various reasons, the government continued to send mixed signals, especially on wood supply and tenure, which ultimately undermined the original determination to restructure the forest economy. If this were not enough, the current trend back towards environmental deregulation puts an additional burden on self-regulatory and market-driven schemes which may not suit every industry. In aquaculture, while the finfish sector does include some large companies that may be both motivated to participate in self-regulation as a means of protecting their reputation and have the resources to implement it, much of the rest of the aquaculture industry is made up of small and medium sized enterprises (SME's) whose participation in self regulation faces special problems. First, with respect to the replacement of regulatory instruments by information, the hands off strategy places a heavy reliance on the expectation that industry will respond rationally to the information provided about government goals and aims. However, it is difficult to communicate with SME's at the best of times and they may not be in a position to respond even if they hear the message. Secondly, with respect to incentives and assistance of various kinds, the policy calls for the development of industry-government partnerships especially in areas such as education and training. SME's are usually too small for partnerships so the arrangements have to be implemented through an industry association, which is often poorly organized with weak coverage of the industry. And, while, in theory, market incentives ought to work as well or better with SME's as with larger companies, in the former there may be just too few opportunities for cost savings to provide the incentive to respond.⁶⁸ In short, it is hard to avoid the conclusion that a more activist style of government is needed to propel the industry along the value-added path.

On the other side of the equation, policy-makers face the huge task of legitimating self-regulation as an adequate response to the social and environmental impacts of the industry. *Substantively*, this task is more easily achieved against a backdrop of a credible regulatory policy capable of stepping in when self-regulation fails. A complete overhaul of the regulatory framework that would serve to implement an ecosystem-based management regime taking account of the environmental impacts of and on aquaculture over a variety of temporal and spatial scales would be the ideal. Unfortunately, such a

⁶⁶ Rahnema, Saeed and Michael Howlett, "Impediments to Industrial Policy : Overcoming Path Dependency in Canada's Post Staples Transition" *Journal of Australian Political Economy*, 49 (2002): 114-126.

⁶⁷ Roger Hayter, *Flexible Crossroads: The Restructuring of British Columbia's Forest Industry* (Vancouver: UBC Press, 2000).

⁶⁸ Gunningham, Neil and Darren Sinclair. *Leaders and Laggards: Next Generation Environmental Regulation*. Sheffield: Greenleaf Publishing, 2002.

thorough-going overhaul is unlikely in the face of the jurisdictional policy legacy we have identified. Less ambitiously, an end to the practice of staying private prosecutions under the *Fisheries Act* and the active encouragement of citizen suits to enforce the existing regulatory framework might serve to restore some public confidence in the existing regulatory regime and provide a suitable baseline from which incentive-based schemes can encourage the industry to go “beyond compliance”.⁶⁹ *Procedurally*, the focus needs to be not just on network governance, understood as better intergovernmental coordination, but on the inclusion of a broader range of interests into the development and implementation of policy. There may be some symbolic significance in the belated announcement of a BC Salmon Aquaculture Forum sponsored by both levels of government, to be chaired by former fisheries minister John Fraser, but a “blue ribbon” process may do little to move positions entrenched over years of dogged resistance.⁷⁰ More promising are the community level approaches to planning and participatory consultation that are needed to gain local, regional support for the intensification of existing aquaculture activities or their expansion into new areas. These consultations are exemplified by the RADEC’s in Nova Scotia. In BC, the emphasis on stakeholder involvement remains focused on planning exercises of various degrees and intensity, giving rise to serious “planning fatigue” on the part of many groups and interests. However, pushing real decision-making authority, especially over site locations and the conditions of licences, downwards to the community level is a significant global trend in aquaculture. Recent developments involving larger roles for municipal institutions and local stakeholders in aquaculture have taken place in both Scotland and New Zealand.⁷¹ There are the usual difficulties associated with strengthening the capacity of municipal institutions to perform such functions and, once again, of ensuring a credible background regulatory presence by provincial and national agencies. Nonetheless, these processes have become ‘critical consultations’ in the sense that their outcomes are critical determinants of licencing and other provisions surrounding aquacultural operations.⁷²

Policies that involve timely consultation and the devolution of considerable decision-making authority downwards in the political hierarchy are also important in Canada to ensure consideration of First Nations’ interest. While the recent series of court decisions on the duty to consult where aboriginal resource interests are at stake are of obvious significance for coastal First Nations, especially in BC, they have also shed some light on the generally distant and high-handed approach that provincial governments have taken towards resource peripheries. It is not too strong to conclude that a great deal of Canadian aquaculture policy suffers from what Chris Allen has called “naïve managerialism” which is bound to fail “because it

⁶⁹ Gunningham, Neil, Robert A. Kagan and Dorothy Thompson, “Social Licence and Environmental Protection: why businesses go beyond compliance.” LSE, Centre for the Analysis of Risk and Regulation discussion paper available at <http://www.lse.ac.uk/collections/CARR/pdf/Disspaper8.pdf> (consulted May 23, 2003).

⁷⁰ See BC Ministry of Agriculture Food and Fisheries news releases at http://www2.news.gov.bc.ca/nrm_news_releases/2003AGF0013-000413.htm (accessed May 23, 2002)

⁷¹ “Bill amended to bring Scottish fish farms under planning control” February 6, 2003, www.intrafish.com (accessed May 23, 2003); “Aquaculture law to get much needed overhaul” New Zealand Ministry of Fisheries news release, November 28, 2001, available at <http://www.fish.govt.nz/current/press/pr271101.htm> (accessed May 23, 2002).

⁷² See Suryanata, Krisnawati and Karen N. Umamoto. “Tension at the Nexus of the Global and the Local: Culture, Property and Marine Aquaculture in Hawai’i.” *Environment and Planning A*. 35, no. 2 (2003): 199-213. More generally see Gunningham, Neil and Darren Sinclair. *Leaders and Laggards: Next Generation Environmental Regulation*. Sheffield: Greenleaf Publishing, 2002.

cannot get around the fact that policy implementation inevitably involves a process of negotiation and compromise between actors in the policy-implementation network”⁷³

In sum, in order to deal effectively with these issues, it is necessary for Canadian policy-makers and administrators to “smarten up” their regulatory regimes. Smart regulation means not merely adding to the toolbox of instruments used in the sector,, but designing a context-sensitive mix of instruments. The existing policy mix is not well designed to deal with the emerging issues raised by the various aquaculture development initiatives currently in progress or being contemplated.⁷⁴ Canadian governments should specifically address the issue of instrument mixes and attempt consciously to design an optimal governance strategy to achieve the twin goals of industry development and public confidence set out in the Aquaculture Policy Framework. Specifically, public confidence in the current repertoire of regulatory instruments needs to be restored before self-regulatory initiatives proceed any further, and serious consideration needs to be given to the legitimation gains that could be realized by pushing the authority for site selection and licencing downwards to municipal authorities with extensive local stakeholder input. Industry may find the changes disadvantageous in the short term, but the alternative is to spread the debilitating confrontational politics of BC salmon farming through the entire aquaculture sector.

While there is more work to be done on appropriate instrument mixes, and especially on the repertoire of self-regulatory instruments suitable in different contexts, a comprehensive research agenda should also attend to the rapidly evolving literature on the dynamics of policy change.⁷⁵ Lesson drawing from other jurisdictions is a key source of new ideas in policy subsystems, and has often been referred to as a potential source of change for Canadian aquaculture. More significantly, federal systems offer opportunities for both lesson-drawing and venue shifting.⁷⁶ Why has this not taken place in aquaculture or, at least, if they have taken place, why have the effects been so negligible? What are the implications of the appearance of new actors in the subsystem, particularly environmentalists, and what can be learned from similar developments that have taken place in other resource sectors? While aquaculture policy is not wanting in suggestions for change, understanding how to bring it about remains the more significant challenge.

73 Allen, Chris. “They Just Don’t Live and Breathe the Policy Like We do...’: Policy Intentions and Practice Dilemmas in Modern Social Policy and Implementation Networks.” *Policy Studies*. 22, no. 3/4 (2001): 149-166 at page 164.

74 Yandle, Tracy. “The Challenge of Building Successful Stakeholder Organizations: New Zealand’s Experience in Developing a Fisheries Co-Management Regime.” *Marine Policy*. 27(200): 179-192.

⁷⁵ Howlett, Michael, “Complex Network Management and the Governance of the Environment: Prospects for Policy Change and Policy Stability over the Long Term.” In E. Parsons (ed.), *Governing the Environment: Persistent Challenges, Uncertain Innovations*, Toronto: University of Toronto Press, 2001

⁷⁶ Eric Montpetit, “Policy Networks, Federal Arrangements, and the Development of Environmental Regulations: A Comparison of the Canadian and American Agricultural Sectors,” *Governance*, 15 (2002): 1-20.

Browse through the list of Canadian Aquaculture and Aquatic bachelor, masters, and doctorate courses, programs and degrees offered by universities in Canada. What is Aquaculture and Aquatic? Aquaculture is the farming, in a controlled environment, of fish, shellfish, and vegetation such as seaweed. This can take place in either a freshwater or marine (mariculture) environment. | « Canada University Programs |. Aquaculture and Aquatic in Canada. The aquaculture industry in Canada is small but growing. The increased global demand for animal protein and innovation in aquaculture production systems has seen the sector increase rapidly. Canada's extensive coastline provides many opportunities for aquaculture.[15] There are many different species of both fin-fish and shellfish being farmed in Nova Scotia.[16]. "Studying Canadian Aquaculture Policy: Issues, Gaps, and Directions" (PDF). Cite journal requires |journal= (help). ^ Flaherty, Mark; Reid, Gregor; Chopin, Thierry; Latham, Erin (February 2019). "Public attitudes towards marine aquaculture in Canada: insights from the Pacific and Atlantic coasts". *Aquaculture International*. 27 (1): 9–32. doi:10.1007/s10499-018-0312-9. Studying Canadian aquaculture policy: issues, gaps, and directions. Annual General Meeting of the Canadian Pacific Science Association, Dalhousie University, Halifax, Canada. Jin Lin-Gen & Li Juan. 2003. On establishing a fishery insurance system with state support. *Chinese Fisheries Economy*, 2003:6. Joint publication of the Ministry of agriculture, China fisheries research institute and China fisheries General Corporation, Beijing, China (available in Chinese only). Liu Jingsheng. 2000. The system of agriculture insurance in China. China's Social and Scientific Publisher House, Hong Kong Spec After almost a century of benign neglect, Canadian aquaculture policy emerged in its modern form after 1984, when the federal government led a complex intergovernmental process of policy renewal. After an initial period in which the foundations for the new policy were laid through intergovernmental agreements, both the federal and provincial governments adopted numerous policies aimed at the promotion of the aquaculture industry. This paper assesses these developments and trends in Canadian aquaculture policy against the emerging issues affecting the sector in the near to medium term. 1. Intro