

Marine Fish Farming and the Blue Revolution: Culturing Cod Fisheries

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Abstract

The Blue Revolution promises to transform wild marine fish into docile domesticates, fish hunters into harvesters. As commercially fished marine species continue to face extinction in the wild due to over-fishing, pollution, global climate change and a host of other anthropogenic assaults, ‘culture’ has emerged as a keyword in the field of marine fisheries management. Like the terrestrial dreams and grandiose visions of their Green comrades a half-century earlier, Blue revolutionaries advocate the application of scientific expertise, industrial technology and trans-national capital in their oceanic culturing projects. These culturing projects influence and seek to transform human identity and ways of living as much as the genetic make-up, behaviours and metabolism of the wild fish species that are targeted for domestication.

Introduction

The Blue Revolution is a term used by the aquaculture industry to refer to the domestication and cultivation of aquatic plants and animals for profitable sale in global markets. It promises to transform wild marine fish into docile domesticates, fish hunters into harvesters. Using the recent development of cod farming in Newfoundland and Labrador as an empirical example of the Blue Revolution in action, we apply the three meanings of ‘culture’ outlined by Raymond Williams in *Keywords*¹ along with insights from critical² and cultural³ geographers to explore some of the material and discursive transformations associated with the

shift from capture to culture cod fisheries. By selecting the cod fishery – a field of human practice with deep cultural meaning in Newfoundland and one that, while highly capitalized and industrialized, is only now undergoing an agricultural transformation that has been well established on land for thousands of years – we seek to articulate some of what is at stake in cultural framings of human–animal relations, and provide a case for the importance of comparative fisheries studies at this moment in history.

We explain how the codfish has been transformed into a domesticated animal both *conceptually* through fisheries management models and *materially* in laboratories, hatcheries and grow-out sites. This will be followed by a parallel story of the culturing process that has been applied to Newfoundland fishing people as they have been transformed throughout various historical periods from commons-dwelling fish hunters through to nationalized industrial fishery workers and finally to contemporary professionalized fish harvesters operating on an increasingly enclosed sea.

The cod story: a managed annihilation of wild abundance

Like stories of the plains buffalo and the passenger pigeon, tales of early cod abundance are legendary. According to reports from the first European explorers of Newfoundland and Labrador, cod were so plentiful they slowed the movement of ships and could be scooped from the sea in baskets.⁴ The natural abundance of cod that supported fishing activities for over 500 years came to a sudden end in July 1992 when a moratorium was placed on all cod fishing, putting 30,000 people out of work – the largest single-day layoff in Canadian history. Since the fishing moratorium, codfish populations have not recovered and continue to decline despite the end of commercial cod fishing. Conservation scientists now recommend that cod be listed as an endangered species, leaving cod fishery workers little choice but to leave rural Newfoundland and Labrador in search of alternative employment.

The Newfoundland cod collapse shook the fisheries science and management community worldwide. Up to the eve of the collapse, scientific managers believed cod and other wild fish stocks could be easily controlled by regulating fishing. Scientific models indicated that the cod stock was growing faster than the fishing fleet's ability to catch

them and plans were in place to gradually increase catches up to a safe maximum sustainable yield.

In the wake of the cod collapse, the hubris associated with wild fisheries science and management has been replaced by a new sense of impotence and calls for dramatic restructuring of fisheries science and management. While developments are complex, one of the central themes in contemporary fisheries science and management has been the mobilization of a variety of meanings of 'culture' applied in different ways to both wild fish and those who once hunted them for their livelihood and subsistence.

Culture: domestication, development and way of life

The three dominant meanings of 'culture' outlined by Williams⁵ provide an interesting framework to analyse the deployments of 'culture' in responses to fisheries science and management reinvention. The meanings of 'culture' include: the taming, domestication and husbandry of wild plants and animals; the development or civilizing of people presented as savage and barbarous by colonizers and administrators; and the anthropological description of distinct human ways of life.

Culture, in its original sense, referred to cultivation, a process whereby wild plants and animals are brought into a sphere of human influence where stewardship, husbandry and caretaking take place, and cultivator and cultivated each become adapted to conditions and terms dictated by human interests.⁶ The various normative and symbolic associations with taming and bringing wildness into the domestic human sphere are complex, ranging from nurturing to exploitation.⁷ This complex of meaning spills over into the connotation and operation of the other two meanings of culture discussed by Williams.⁸

Processes of culturing and domestication have framed relations that extend well beyond human dealings with wild plants and animals to include the development of hierarchically related groups of people in the context of the civilizing projects of imperial colonization, as well as transformative relations within societies.⁹ Here 'culture' implies a general process of intellectual, moral, spiritual or aesthetic advancement from wild savagery through to civilized domestication and ultimately individual freedom and responsibility at the apex of a hierarchical chain of being.¹⁰

Romantic and resistance movements against the domestication of wild nature and the subjugation of human otherness and difference

grounded in hierarchical dualisms have also deployed 'culture'. In this third meaning, 'culture' stands for diverse and unique ways of living that are valued intrinsically without the need for improvement or eradication through taming, domestication, civilizing or development. Culture in this anthropological sense refers to unique ways of organizing, conducting and adding meaning to life associated with historic periods, places and groups of human beings and other forms of life often situated outside or beyond the dominant norm.¹¹

These three meanings of culture provide a rich tapestry of relations between and among human beings and other forms of life. What we wish to do is to explore how some of these relations are playing themselves out with respect to the culturing of cod and fishing people in Newfoundland. We also wish to highlight, following Mitchell,¹² the agendas built into conceptualizations of culture and the way culture is being deployed to reorder fishing societies and relations between fish and people around the world.

Culturing cod: domesticating crisis into opportunity

The dramatic collapse of cod stocks and their failure to recover in the post-moratorium period led to increasing interest in the creation of an industrial cod-farming industry by seafood processors and government agencies who were attracted to the control and stability cod farming promised to deliver over aspects of the cod life cycle that were increasingly unstable and uncertain in the wild.¹³ As monetary support from the Canadian welfare state – for cod fisheries workers, cod science and wild stock recovery efforts – declined in the post-moratorium period, funding for cod aquaculture research and development expanded in an attempt to domesticate cod throughout its entire life cycle, in what is referred to in the industry as 'egg-to-plate' farming. Within three years of the cod fishery collapsing, the Canadian Department of Fisheries and Oceans (DFO) had created an Aquaculture Development Strategy that defined 'culture' as both the domestication of wild aquatic species and the development of individual and corporate ownership of those species:

Aquaculture is the culture of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. *Culture* implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc.

Culture also implies individual or corporate ownership of the stock being cultivated (emphasis added).¹⁴

The Aquaculture Development Strategy fused culture-as-domestication of the wild with culture-as-development in a context of market triumphalism where private property was coming to be understood as the most effective and efficient way of allocating and regulating ocean spaces and species. In so doing, aquaculture was tied to the enclosure of the coastal commons and connected to a narrative of economic and technological progress. This association of fish farming with individual and corporate ownership was also connected with a new form of culturing aimed at fishing people.

Culturing the fisherperson: developing savage hunters into professional harvesters

Just as wild codfish began to be cultured in post-moratorium Newfoundland, so did fishing people. Even though there were many other species of fish being hunted off Newfoundland and Labrador after the moratorium on cod, the fish hunter became constructed as an uncivilized ‘welfare dope’ unfit for the challenges posed by an increasingly competitive global seafood market and quality-obsessed industry.

In the wake of the cod collapse, the federal government provided cash support for fishing people. These welfare payments, however, came with strings attached. Fishery workers found themselves caught up in a number of managerial interventions aimed at fundamentally transforming their identity as hunters of fish. The culmination of these managerial interventions was a mandatory professional fish-harvester programme that hierarchically divided fishing people with the goal of transforming all who remained on the water into both efficient harvesters and ethical stewards of the sea. Fishery workers who could not or would not professionalize became *de facto* criminals, at risk of being arrested by fisheries officers or reported by their neighbours through poacher snitch lines based on the *Crime Stoppers* model.

Transforming the identity of fishing people involved direct coercive policing actions as well as subtle linguistic shifts. Fishermen and women deemed legitimate by fisheries management agencies were referred to as fish harvesters and they were assigned graded categories based on their level of formal fisheries training at Apprentice, Level I and Level II. Cod fishing for food was redesignated a recreational activity and was

framed as a privileged leisure activity as opposed to a right for local people guaranteed in the province's 1949 terms of union with Canada.

Linguistic reframing of the fisherperson was accompanied by academic and managerial claims in fisheries policy and management literature that fish hunters intrinsically lacked an ethic of stewardship towards the sea and its species. The professionalization programme adopted a code of ethics for responsible fishing and incorporated ethical training into its mandatory classes. The allocation of individual and corporate property rights to ocean spaces and species was promoted as the only viable form of ownership compatible with the development of stewardship ethics and professional fish harvester identity. In short, the ideal fisherperson became constructed in the image of terrestrial agribusiness.

The seductiveness of culturing cod and fishing people

The cultured cod and the professional fish harvester are seductive, holding normative and political appeal. Domestication is seductive because of the control it offers over the life cycle of animals, as Lockett plainly states:

Cod aquaculture brings many things under control that were extremely uncertain when cod were hunted instead of farmed. Cod aquaculture's economic appeal is tied to the fact that it provides ... a consistent supply of product, and steady, predictable year-round production ... [by] getting animals to spawn when you want them to rather than when nature dictates.¹⁵

The cultured cod and fisherperson also provide managerial appeal for fisheries scientists and the state. The fisheries manager regains control over the unpredictable cod that proved to be unmanageable in the wild. The state gains a competent partner in the developed and civilized professional fish harvester – a partner, moreover, less likely to protest against fishery policy. Given the right set of incentives and retooled management 'culture', the professional fish harvester can assume risks and management responsibilities that were once the sole burden of federal government agencies, as explained in this quote from the DFO's *Atlantic Policy Review*:

[By allowing professional fish harvesters to] make their own business decisions and be accountable for the consequences ...

[DFO hopes] to spawn a new and positive fisheries management *culture* and usher in a new era of public–private sector co-operation in Canada’s fisheries (emphasis added).¹⁶

The domestication of cod can also draw on positive normative associations of caretaking, husbandry and stewardship that are not available in the wild capture fishery. These moral associations are evident in advertisements for aquaculture products. One, for example, displays a fish with a baby’s soother in its mouth, and asks, ‘Do your fish need a babysitter?’ The text accompanying the ad goes on to explain that ‘*the YSI 5200 Recirculating System Monitor with Aquamanager software* delivers monitoring capabilities simple enough to monitor one tank and powerful enough to manage a full scale farming operation from anywhere in the world’.¹⁷

The ease with which aquaculture activities can be presented as caring and benign while masking their underlying hierarchical relations of manipulation and control over the genetic make-up, behaviours and metabolism of aquatic species illustrates the power and complexity of domestication and husbandry as material practices and symbolic metaphors. The irony is that the technology peddled by YSI and other water-quality monitoring companies is required because of the artificial and exploitative conditions under which the farmed fish are being cultivated. These conditions increase the stress on individual fish and provide opportunities for infection and die-off due to decreased oxygen content and disease outbreaks in their net pens and rearing tanks.

Obstacles to culturing cod and fishing people

While cod aquaculture is seductive to many, this is not the case for all. Wild cod resist domestication through their continued existence as a wild species and through their unique biological characteristics. The biological traits of wild cod make farming them extremely expensive. Unlike salmon, cod must be fed cultured plankton before they can be weaned onto commercial pellet feeds, and wild cod have a nasty habit of becoming cannibalistic and bullying their smaller neighbours, as described by Boyce, a cod culturalist:

Cod are very cannibalistic at a young age, for this reason, periodic size grading is important to obtain good survival and yields, and

to eliminate runts, which may encourage cannibalistic behaviour . . . Larvae are closely observed, once they reach 50–60 days of age, for noticeable size differences and for evaluating the percentage of larvae that are undergoing metamorphosis. They are also closely watched for evidence of cannibalism and bullying by larger-sized larvae.¹⁸

Fishing people have also resisted aims by managers to transform their identity and to divide them into professional fish harvesters, poachers and recreational fishers. Cod fishing for food is understood by most local Newfoundland residents as a right granted to all citizens under the terms of union with Canada. Fishing for cod is framed as a way of life that ought to be available to all rather than as an elite recreational activity for tourists or a commercial endeavour for a privileged few. Inshore fishing people contest scientific assessments of cod that claim they are endangered and argue there is plenty of cod available to feed Newfoundlanders, even if they agree there is not enough for a commercial cod fishery.

Several inshore fishing groups, finally, have called for alternative forms of cod aquaculture with the goals of wild stock restoration rather than profitable 'egg-to-plate' production.¹⁹ There are a variety of ways in which the culturing of cod and fishing people can proceed. Each of these has substantively different material and normative practices associated with it, and varying amounts of taming, length of capture and incorporation into regimes of control with respect to the life cycle of cod and the identity and behaviour of fishing people.

Contradiction and struggle among domestication, development and ways of life

It is important to realize that full-cycle industrial cod aquaculture emerged in Newfoundland and Labrador as an economic opportunity only after wild cod became commercially extinct. Promoters of the Blue Revolution believe that technical solutions can resolve the problem of global overfishing and declining wild catches. The normative appeal of culture-as-domestication, however, which contrasts the fishing-as-barbaric tradition with farming-as-enlightened stewardship, obscures the many material connections that necessarily exist between wild fisheries and aquaculture. Most simply, farmed cod must be fed fish that have been caught in the wild.

Promoters of aquaculture, moreover, obscure the wider social effects of technological innovation. Advances in technology do more than simply introduce efficiencies within the firm. They are also revolutions in social relationships that remake landscapes, geographies and human-environment relations. For example, as Cronon argues, the introduction of the railroad to the American West freed the movement of goods and people from the limits of solar energy and animal physiology. This technical development became ‘the chief device for introducing a new capitalist logic to the geography of the Great West’,²⁰ accelerating the flow of goods, people and information, and refashioning the experience, and value, of time. The expansion of aquaculture, similarly, reflects a shift in the landscapes and social relations of coastal communities, framed around the capitalist logic of competition, profit and growth. Ultimately, however, our interest in cod aquacultures in Newfoundland and the insights that cultural studies can bring to the Blue Revolution, goes far beyond pointing out the biophysical contradictions of industrial fish farming. What we find most interesting are the multiple meanings of culture that emerge when one scratches the surface of fish domestication and the interconnections oceanic culturing projects have with the identity of fishing people and the material make-up of cod. Whether it is the physical domestication of the wild cannibalistic cod, the civilization of the barbaric fish hunter into the professional harvester, or resistance to both of these forms of culturing in the name of a way of life tied to hunting fish for food on a coastal commons, the diversity, complexity and interconnections of aquacultures in Newfoundland illustrate an ongoing process, stories in the making. What the outcome and moral of these stories will be remains open to interpretation and contestation, but the first step surely is to unpack the many meanings of ‘culture’ and the diverse practices of culturing that are currently operating in the world’s oceans.

Notes

- 1 Raymond Williams, *Keywords: A Vocabulary of Culture and Society*, revised edn (New York: Oxford University Press, 1980).
- 2 K. Anderson, ‘A Walk on the Wild Side: A Critical Geography of Domestication,’ *Progress in Human Geography* 21, 4 (1997): 463–85.
- 3 C. Barnett, ‘Culture, Geography, and the Arts of Government’, *Environment and Planning D: Society and Space* 19 (2001): 7–24.
- 4 M. Kurlansky, *Cod: A Biography of a Fish that Changed the World* (New York: Penguin Books, 1997).
- 5 Williams, *Keywords*.
- 6 Williams, *Keywords*; Anderson, ‘A Walk on the Wild Side’.
- 7 Williams, *Keywords*; Anderson, ‘A Walk on the Wild Side’.

- 8 Williams, *Keywords*.
- 9 Anderson, 'A Walk on the Wild Side'; Williams, *Keywords*.
- 10 Anderson, 'A Walk on the Wild Side'; Williams, *Keywords*.
- 11 Anderson, 'A Walk on the Wild Side'; Williams, *Keywords*.
- 12 D. Mitchell, *Cultural Geography: A Critical Introduction* (Oxford: Blackwell, 2000).
- 13 J. Lockett, 'Aquaculture What's on the Menu?' *Atlantic Business Magazine* 12, 3 (2001): 52–62.
- 14 Department of Fisheries and Oceans, *Federal Aquaculture Development Strategy* (Ottawa: Government of Canada, 1995), 3.
- 15 Lockett, 'Aquaculture: What's on the Menu?' 56.
- 16 Department of Fisheries and Oceans, *The Management of Fisheries on Canada's Atlantic Coast: A Discussion Document on Policy Direction and Principles* (Ottawa: Atlantic Fisheries Policy Review, 2001), 26, 49.
- 17 YSI, *Water Quality Monitoring in Aquaculture— Do Your Fish Need a Babysitter from the Experts in Water Quality Monitoring?* (2013). <https://s-media-cache-ak0.pinimg.com/236x/7f/4e/73/7f4e73df1a8cbdaa3cecf4b039935bcd.jpg>
- 18 D. Boyce, *Cod Aquaculture—Egg to Plate Project 2001*, Aquaculture Research Development Facility (Ocean Science Centre. Logy Bay, NL, 2002), 31.
- 19 D. Bavington, *Cod Aquaculture as a Restoration Tool for an Endangered Species*, Canadian House of Commons Standing Committee on Fisheries and Oceans (St John's, NL, 2003).
- 20 W. Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton & Company, 1991), 81.