

## UNDERSTANDING THE COHO CRISIS: Political Knowledge in a Fractured Salmon Fishery

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*Abstract* The 'Coho Crisis' of 1998 permanently transformed the commercial salmon fishery of British Columbia, Canada. Low returns of coho salmon precipitated drastic reductions in opportunity, and major changes to fishing practice and fishery structure. The crisis constituted one of the first critical conflicts over biodiversity and by-catch in the British Columbia fisheries, and the resulting conservation measures continue to have practical, political, and ideological impacts on the salmon fishery. This paper discusses how commercial salmon fishers understand the Coho Crisis, focusing on the way that gear type and ethnicity differentiate fishers' political knowledge. Understanding how political knowledge is created and how it functions has significant implications for how anthropologists engage with the concept of local knowledge. Fisheries regulations have created discrete communities of interest within the salmon fishery and thus structurally influence fishers' knowledge of both fish and the fishery. Fishers' diverse positions within the context of resource competition shape their understandings of ecological and political processes. Engaging with fishers' political knowledge - what they know about fisheries rather than what they know about fish - this paper investigates the way in which conservation and allocation are understood within a highly politicised and competitive fishery. What fishers 'know' about the Coho Crisis, their analyses of the intertwining of conservation and allocation, has significant implications for how they participate in fisheries and in co-management processes.

### Introduction

*The coho crisis was specifically engineered. Coho was a legitimate concern but was used to the advantage of certain user groups. There were more political things involved. (Bob, former troller<sup>1</sup>)*

In May 1998, Fisheries Minister David Anderson announced a comprehensive Coho Recovery Plan that would result in massive changes to, and reductions in, the salmon fisheries of British Columbia. During interviews with commercial fishers in Prince Rupert BC in 2001 and 2002, the 'Coho Crisis' was one of the most controversial topics that arose in our conversations. The motivations and methods of this conservation initiative were questioned and refuted. The associated retirement of commercial salmon licenses was interpreted as the ultimate purpose of coho conservation and many fishers believed that the Coho Crisis was manipulated to encourage fleet reduction. During my research in Prince Rupert BC between 2001 and 2003, there was general consensus from commercial fishers with whom I spoke, that coho conservation was a disguise for the reallocation of

fishing opportunities. However, particular fishers understood the details of this perceived allocation initiative in very different ways. The Coho Crisis provides a helpful case study for the investigation of how knowledge is differentiated within the commercial fishing industry. This paper will focus on the positionality of fisher's knowledge and the fine details of its social construction in a competitive, fractured industry.

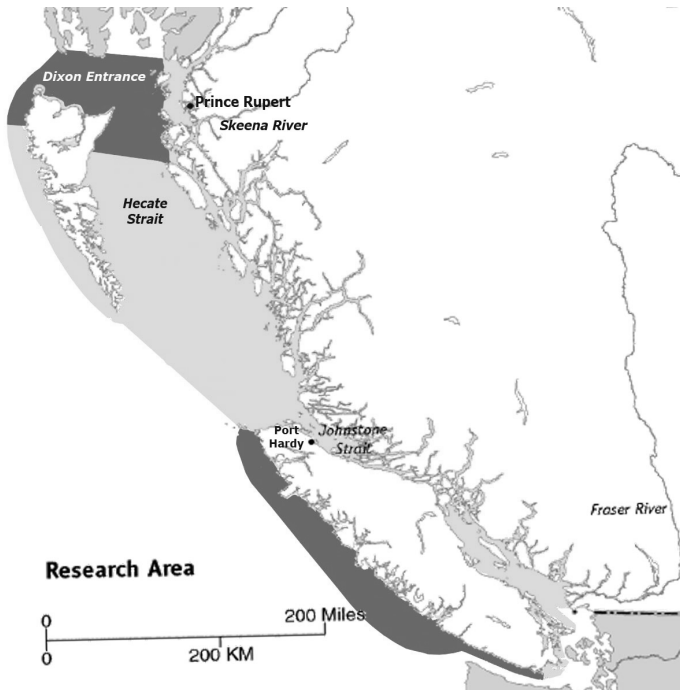


Figure 1. *Research area.*

Fishers' knowledge is much broader than the ecological information that allows them to successfully find and harvest fish. Their knowledge includes ecological information about fish, but also political understandings of fisheries management and the larger context of their fishing activities. It is shaped by circumstances of competition, regulation and resistance. Commercial fishers understand their own activity, that of their peers and rivals, and that of the government, in light of past and current experiences of allocation and conservation initiatives, and within the power structure underpinning resource management. Fishing behaviour is based on both ecological knowledge and understandings of current and future opportunities, competing interests, public perception and government mandates. Fishers' understandings of ecosystem health, as well as their business strategies, are shaped by their perception of politics and power. Furthermore, fishers' *political knowledge* is becoming increasingly important as a factor in harvesting strategies and business success. Without an adequate comprehension of both the ecological and non-ecological aspects of fishers' knowledge, the future success of fisheries management cannot be anticipated in either academic or applied fora.

## Biological Concerns and Risk Averse Management

Coho are one of the five species of salmon, targeted by commercial troll and recreational fisheries, and currently encountered primarily as by-catch by seine and gillnet fisheries. Coho have been, and remain a food source for First Nations, but tend to be a less-preferred species, compared to sockeye and chinook. Department of Fisheries and Oceans (DFO) stock assessments in 1997 indicated declining abundance of coho, with especially drastic declines in the upper Skeena populations (coho stocks from the tributaries of the Skeena above the Babine watershed in northern BC) and the Thompson River (a tributary of the Fraser River) (PSARC 1998). Abundance declines were attributed to over-harvesting (at rates of sixty percent for Thompson coho), habitat degradation, and poor marine survival rates (as low as three percent in the 1990s) (See DFO 1999). Conservation measures specific to coho had been introduced during the 1997 season, due to extremely poor returns attributed to decreased ocean survival, but spawner counts in the autumn proved insufficient. Regional Coho Response Teams were created in February 1998 to consult with stakeholders and report to the Minister by May, when he announced massive changes to fishing practice and fishery structure.

Minister Anderson announced that in 1998 there would be no directed fisheries on coho and mandatory non-retention<sup>2</sup> in all fisheries. The coast was divided into red and yellow zones based on differential risks to coho, and resulting in geographically-differentiated fishing opportunities. In red zones there would be an objective of zero fishing mortality of upper Skeena and Thompson (Fraser) River coho stocks, which effectively closed all salmon fishing. In yellow zones, where coho from these high-risk stocks are not prevalent, there would be limited fishing when the risk of coho mortality was minimal. Barb-less hooks would be required in all commercial troll and recreational fisheries. There would be increased monitoring and enforcement in all fisheries<sup>3</sup> (see Anderson 1998).

The federal government committed 400 million Canadian dollars to the Coho Recovery Plan, with 100 million Canadian dollars of that money directed to enhancing salmon habitat. In light of the major impacts the conservation measures would have on commercial fishing opportunities throughout the anticipated term of coho recovery (at least six years), a further 100 million Canadian dollars was dedicated to assisting communities and individuals in adjusting to the changing fishery. Finally, 200 million Canadian dollars was allocated to fleet restructuring, including license retirement, fishery diversification, and the development of selective fishing techniques (Anderson 1998).

A total of 195 million Canadian dollars was spent on license retirement, funding the purchase of 1,404 commercial salmon licenses. The Voluntary License Retirement Programme was conducted through a reverse auction process in three bidding rounds. An independent advisory committee reviewed applications, and ranked bids of vessel owners with similar gear type and vessel length. The programme prioritised the retirement of multiple license packages and licenses on vessels which only fished salmon over those with access to other fisheries. Through the buyback, 216 seine, 628 gillnet and 460 troll licenses were retired from the fishery. Combined with the eighty million Canadian dollars buyback during the restructuring under the Mifflin Plan of 1996, the salmon fleet was reduced by fifty-four percent between 1996 and 2000 (Government of Canada 1999, 2000).

Species selectivity became a major focus of DFO salmon programmes and eighteen million Canadian dollars was spent between 1998 and 2000 on selective gear development (Government of Canada 2000). Projects included the testing of alternative technologies (fish wheels, tooth tangle nets) and release techniques designed to reduce coho mortality. Selectivity requirements became integrated into the fishery regulations, and remain in place. All gear types were subject to time and area closures in order to minimise coho encounters. The seiners were restricted from using their stern ramps to haul their nets onboard, and instead had to 'brail' the fish, using small dip-nets to bring hundreds onboard at a time, releasing coho unharmed. Trollers had to clip the barbs from their hooks to facilitate easy release of coho, although this also made landing other salmon more difficult. Gillnetters fished shorter days (to avoid dawn and dusk sets which traditionally encountered higher numbers of coho), and were required to pick their nets after short sets to minimise coho mortality. All gear types were required to 'resuscitate' encountered coho in a revival box. These boxes of flowing saltwater were considered to improve the survival rates of released coho, by reviving them after the stress of capture, prior to releasing them gently back into the ocean or river.

Thus, the federal government approached the Coho Crisis using both technical and financial strategies. Nevertheless, the impact of the conservation initiative was extreme for many fishing communities, and the political ramifications continue to influence salmon politics. The Coho Crisis was one of the first critical conflicts over issues of biodiversity and by-catch within the Pacific commercial fishing industry. As a signatory to the international Convention on Biological Diversity, the Canadian government had committed to sustainable resource use and the protection of biodiversity. Ten thousand different breeding stocks of salmon spawn in BC streams (Copes 1998:2); however, the relative health of those stocks is extremely varied. This variability poses a significant problem for the management of mixed stock, interception fisheries, which include most commercial salmon fisheries. Biodiversity and risk-averse management mandate that the DFO manage to the weakest stock, which means fishers can see an abundance of fish, but are prevented from fishing due to the micro-management of particular streams. In the coho fishery, this conflict between abundance and biodiversity was heightened by the fact that most of the commercial salmon fisheries (north coast troll excluded) did not target coho, and so their lucrative sockeye fisheries were being curtailed due to efforts to save the weaker stocks of a by-catch species. The situation was one where thousands of sockeye could not be harvested, in order to save a few hundred coho spawners.

I arrived in Prince Rupert two and a half years after Minister Anderson's prescriptions of changes to fishing practice and fishery structure. Some had weathered the storm, others had been removed from the fishery in the fleet reduction process that began under the Mifflin Plan in 1996 and was enlarged during the Coho Crisis. Selectivity requirements for salmon fishing remained in place, as well as time and area closures for coho avoidance. The northern trollers had not had a viable season in three years and were frequently described as 'doomed'.

None of the commercial fishermen<sup>4</sup> I encountered spoke against the conservation of salmon. Most of them were extremely committed to maintaining healthy fish stocks for their own future, and that of future generations. However,

the specific conservation values and priorities of commercial fishers often differ from the general goal of biodiversity and the practice of risk-averse management. North coast fishers question the ability of the DFO to micro-manage biodiversity to the degree that they attempt to do so. They perceive that the limited DNA testing that DFO budgets afford restricts the department's ability to truly enumerate various stocks and understand their dynamics. The fishermen tended to express much more utilitarian conservation priorities:

*The upper Skeena and upper Fraser coho stocks are comparable to the number of people in the world living at greater than 10,000 ft above sea level. There are not very many of them, and they are just hanging on. It's just not good habitat. They can exist there, but it's tough, and can easily be put off balance. The upper river stocks – there is a point where they aren't viable. There's a reason those stocks are in danger – they are on the fringes. They are an indicator, perhaps, but if they are in trouble there is no reason to panic about the stocks in general. To make those stocks the standard is not realistic. Things in marginal environments go extinct. That's history. (Sam, commercial troller)*

This fisherman supports conservation measures but is more pragmatic in his approach to biodiversity concerns. The upper Skeena and upper Thompson coho stocks were not perceived to be a valid conservation priority due to their marginal habitat and fragile population despite fishing effort. Prince Rupert fishermen suggested that the upper Skeena streams did not consistently have the necessary water levels to support spawning, and thus coho spawns were always intermittent:

*Some of the rivers they worried about never did have cohos. We haven't fished them in 3-4 years and there are still none up there and never will be... instead of buying us out now they are starving us out. (Dave, commercial troller)*

While fishers' conservation values and priorities differ from those of environmental organisations and the DFO, the conflict over the Coho Crisis was not based only on disparate valuations of biodiversity. The Coho Crisis and fishers' responses to it are characterised by a debate over allocation.

## **The Context of Competition**

Fisheries regulations and management structures have divided those who fish salmon into discrete communities of interest. At the broadest level, the fishery is divided into three user groups who compete for access to the resource: First Nations fisheries, commercial fisheries, and recreational fisheries. Within the commercial fishery, the three gear types, seine, gillnet, and troll can also compete for time, area, and fish. And finally, the politics of allocation have resulted in Aboriginal commercial fishers within all gear types having a particular perspective on access to salmon.

At the intersectoral level, the First Nations fisheries reflect the regulatory segregation of Aboriginal fishing practices. The Aboriginal 'food fishery' was created in 1877 by regulations which falsely differentiated the commercial and subsistence aspects of Aboriginal fisheries. Current First Nations fishing opportunities reflect the recognition of the communal right, and the priority of First Nations to fish for food, social, and ceremonial purposes that were established through the Sparrow case in 1990. Since 1991, the DFO has generally managed First Nations fisheries through the Aboriginal Fisheries Strategy (AFS), which provides salmon allocations to First Nations and structures food fisheries and commercial openings. While the AFS does not recognise that First Nations have an Aboriginal right to a commercial fishery, a pilot sales programme has been developed to allow the sale of food fish allocations. First Nations commercial fisheries have been strongly opposed by commercial fishing interests, with demands for compensation for any re-allocation of fishing opportunity to Aboriginal fisheries.

Recreational fisheries have been a steadily increasing source of competition for access to salmon and other species during the last two decades. In 2002 saltwater recreational fishers bought 333,753 licenses and the sports fishing industry generated 550 million Canadian dollars in sales, making it a significant political and economic force (McRae and Pearse 2004:11). The commercial component of the recreational fishing interest, the charter and lodge operators, have proved a well-organised and well-funded adversary to commercial fishers during allocation conflicts. A DFO study on the economic value of salmon to the commercial and recreational fisheries supported the allocation of salmon to the recreational fishery based on the greater contribution to the economy made by a recreationally caught salmon (Blewett 1996).<sup>5</sup>

During the 1990s these three sectors have regularly clashed over access to salmon resources. Since the commencement of the AFS, commercial fishers have criticised First Nations fisheries as 'race-based' commercial fisheries and have participated in protest fisheries during pilot sales openings. Commercial trollers and the recreational fishery compete directly for access to spring and coho salmon, and since 1999, priority access at times of low abundance has been allocated to the recreational sector. Low abundance has been the key issue determining the heightened intersectoral conflict during the last fifteen years.

Gear type has not always been such a meaningful category of experience in salmon fishing. Prior to 1996 it was common for boats to participate in both troll and gillnet fisheries at different times during the season. People moved between gillnetting and seining at different points during their careers, especially First Nations commercial fishers (see Menzies 1994). However, after the single-gear restriction in 1996, the gear types were fully separated by a licensing structure, and were designated percentages of the annual commercial harvest. Adjusted to account for the changes in fleet distribution from the license buybacks, the allocations of the commercial salmon harvest are now: thirty-eight percent gillnet, twenty-two percent troll, forty percent seine.<sup>6</sup> Despite this allocation process, restricted opportunities in recent years have heightened the competition between gear sectors.

It is within this context of competition that we must understand what fishers say about the Coho Crisis. Since the Mifflin Plan the commercial fleet has become increasingly fractured by differences such as gear type and fishing area. The Mifflin Plan (named after Fisheries Minister Fred Mifflin) introduced major

restructuring in the fishing industry to cope with the overcapacity created by previous management structures. Fishers had to choose one gear type and designate their A license as troll, seine, or gillnet. The coast was divided into different areas for each gear type (three areas for troll, three for gillnet, and two for seine) and each fisher had to choose one area to fish with their current license. If they wanted to fish another gear type, or another area, they would have to purchase another license from a participating vessel, and 'stack' the two licenses on their vessel. Through stacking, a vessel would become licensed for multiple salmon fisheries. Single-gear licensing reduced the flexibility and fishing opportunity of salmon fishers, especially that of the small boat fleet. Area licensing reduced the fishing opportunities associated with an A license, requiring fishers to invest in a second license in order to retain access to areas they had previously used. The Mifflin Plan also included an eighty million Canadian dollars buyback programme through which 810 out of 4412 eligible salmon licenses were voluntarily retired through sale to the government. The buyback inflated the value of licenses by creating a new market, making 'stacking' more expensive for fishers trying to retain their previous level of fishing opportunity.

Management policies have thus cemented and reinforced the differences between gear sectors. Broader-level policies, such as the AFS, have increasingly constructed competition between Aboriginal and commercial fisheries, and during the last two decades commercial fishers have faced increasing external competition from the recreational fisheries. Simultaneous to these processes, the price of salmon has steadily decreased and fishing opportunities have been restricted, resulting in an eighty percent decrease in the landed value of salmon over the last decade (McRae and Pearse 2004: 8).

Commercial salmon fishers are thus experiencing significant impacts from both competition and conservation and the two forces are increasingly intertwined in fishers' understandings of the contemporary fishery.

## **Methodology**

Between January 2001 and September 2003, I formally interviewed forty-nine commercial fishermen (owner-operators) in Prince Rupert, and spoke informally with another fifty. Of the sample of formal interviews, thirty-five were with salmon fishermen who were directly impacted by the Coho Crisis, and who commented directly on this issue. My research engaged a series of snowball samples. Six index individuals were identified through prior contacts and preliminary fieldwork. Each of these individuals provided the names of potential participants who were engaged in the fishing industry, and in some cases, from targeted subgroups. For example, initial contacts were asked to identify 'local experts', key figures in their respective industries, as well as their specific industry peers, i.e. seine skippers were asked for the names of other seine skippers. This process allowed for both a breadth of contacts from various positions in the industries, as well as key players identified within the community. Fishing women, and skippers of a variety of ages, were specifically targeted to achieve sample breadth.

The snowball technique resulted in a stratified sample of salmon fishing owner-operators which reflects the gear-type composition of the fleet.<sup>7</sup> Eleven of

the salmon fishermen with whom I spoke were of Aboriginal ancestry, which corresponds to identified rate of First Nations participation in the industry (twenty-nine percent) according to Gislason *et al.* (1996:s-12). Three fishermen, including one First Nations fisherman, refused to be interviewed for the project. Interviews with other community members, including crew, DFO resource managers, recreational fishers and charter operators provided further data regarding industry competition.

The identification of local experts was not as quantitatively systematic as that employed by Davis and Wagner (2003) in their investigation of Nova Scotian fishers' ecological knowledge. However, as my research objective was not the documentation of ecological knowledge as a management dataset, but rather the understanding of the political knowledge of fishers, this approach provided an appropriate cross section of industry participants. Participants were asked a series of general questions, in addition to questions specific to their fisheries. Every salmon fisherman was asked specifically about the Coho Crisis, regarding both short-term and long-term impacts.

### **Perceptions of Allocation**

Many of my interviews with commercial fishermen about the politics of fisheries management were structured around regulatory changes over time. Regulation provided the temporal structure for their work histories, with datable seasons of disruption and change that shaped their fishing careers. Hence, as a pivotal moment of change, the Coho Crisis came up in every interview with a salmon fisher. There were differing opinions regarding the biological basis of the coho conservation measures. Approximately half the fishers believed that there had been real declines in the abundance of the Thompson coho, or Skeena coho, or both. The other half of the fishers expressed doubt regarding the validity of the population concerns. They suggested that coho stocks were healthy throughout the 1990s and that the basis of the Coho Crisis was completely bogus. What there was complete consensus on, however, was that the Coho Crisis operated as a means of reallocating salmon between competing groups of resource users.

Whether they agreed that coho abundance had declined and to what degree, all the fishers understood the Coho Crisis to have been used by the DFO to effect desired transformations in the fleet and in salmon allocations. The Crisis was either read as re-allocation disguised as a conservation measure, or as a conservation concern which allowed the opportunity for long-desired changes.

*They have an environmental and conservation angle that no one can argue with. It's a powerful tool and they can do everything they want to the commercial fleet...I don't know if the coho crisis happened deliberately or it was a real concern. I think it was a biological concern and they realised after what a tool it was. Then they did use it to manipulate the industry. (Dave, gillnetter/troller)*

*It's neat. You set up a crisis and find a solution to the crisis. If you create the crisis, you can have the solution ahead of time. This is one of the things the government has done with the fisheries...Resource based in-*

*dustries have come under extreme fire, in most cases for politics alone. In other cases, there have been some real concerns and issues. But overall it did tend to be political in nature...Conservation became a convenient way of instituting the changes the government felt would better suit their purposes. Very seldom did it really deal with fish biology.* (Don, former gillnetter)

*It was bullshit. It was a political move. In my mind, they were trying to starve the fishermen out, particularly the troll sector...It's easier to buy back licenses when guys are making 10,000 Canadian dollars rather than 100,000.* (Gary, longliner, former troller)

*Coho was a political creation. Its basis was some weak runs in the upper Skeena, but they were never historically strong fish. The big year of the crisis was the biggest coho run...It was part of the DFO policy to beat the crap out of the troll sector to soften them up to buyback their licenses.* (Bob, longliner, former troller)

A classic ecological knowledge research approach would focus on what fishers had to say about coho populations: whether they had observed declines in abundance prior to 1998, and other data derived from their interaction with the fish. I contend that what is especially interesting here is the data derived from their interaction with the *fishery* and the conservation measures. Three years after the Coho Crisis was announced, these fishermen perceived the biological issue in light of the buybacks and restructuring, and their continued lack of access to previous levels of fishing opportunity. For them, the key issue is not whether coho populations declined or remained abundant, but that this real or invented decline was the basis for the achievement of government goals for change and reduction in their industry.

Dyer and Moberg (1992:28) have noted similar responses of Florida shrimpers to Turtle Exclusion Devices (TED), a technology designed to limit turtle mortality in the shrimp-dragging fishery. Shrimpers believed that they were bearing all the responsibility for turtle conservation because they were easier to control than other contributors to turtle population declines, such as industrial pollution. The perception of unfairness led them to attribute a 'conspiratorial intent' to TED regulations and to read the conservation measures as a means of reallocating coastal zone use. Perceptions regarding the underlying motivations of conservation measures have significant implications for compliance and participation. Dyer and Moberg also found that shrimpers resisted turtle conservation measures surreptitiously. While Pacific fleet compliance to coho conservation measures has not been identified as a major problem, there are fishers who resist the conservation requirements of short sets, half-nets, and the use of revival boxes, due to their perceptions regarding the overstatement or fabrication of coho declines for political reasons.

The most important information that was derived from interview questions about the Coho Crisis was regarding the way in which different fishers understood the reallocation process to function. All of the fishers perceived the Coho Crisis through the lens of reallocation; however, they perceived different beneficiaries of the reallocated harvests.

*That was reallocation under the guise of conservation. They are trying to squeeze out as many as they can to make room for fish farms and commercial sports fisheries. (Len, troller)*

*They want people out of the industry so they can reallocate to the Aboriginal groups in treaties. And to the sports fishing industry which they think makes more money. (Ken, former gillnetter/troller)*

*With the Skeena coho – they are trying to save 4000 coho and they are willing to curtail an entire multimillion dollar sockeye fishery? It's just an excuse to give it to the seine boats. (Bill, gillnetter)*

*There are record runs and we're not allowed to take them. Many people have a gut feeling that the government is trying to make it so you can't make a living fishing, so they can give it all to the Natives. (Ron, seiner)*

*It's a pile of bullshit. There isn't a coho crisis really. They're just trying to reallocate the resource to the sporties. (Pam, First Nations gillnetter)*

There is thus both consensus and divergence in commercial fishers' understandings of the Coho Crisis. Most commercial fishers appeared to read the conservation measures as heavy-handed, with an ulterior motive of reallocation. Yet the understanding of reallocation was differentiated by both gear type and ethnicity. Of the fishers I spoke with, the trollers were focused on their loss of fish to the sports/recreational sector. Euro-Canadian gillnetters perceived both a loss to the large boat fleet (seines) and to First Nations fisheries. Seiners tended to see First Nations fisheries as the beneficiaries of reallocation. First Nations gillnetters did not see any benefit to themselves (within the commercial fishery) and understood the sports sector as benefiting from their loss of access to coho.

<b>Fisher Position</b>	<b>Fish reallocated to</b>
Troller	Sports
Gillnetter (Euro-Canadian)	First Nations or Seines
Seiner	First Nations
Gillnetter (First Nations)	Sports

Table 1. *Fishermen's Perceptions of Reallocation*

The trends identified above cannot be extrapolated to the entire fleet, but they reflect a definite pattern within the stratified sample of northern license holders who participated in my research. This 'map' of fishermen's perceptions of the impacts of/motivation for the Coho Crisis was derived from my formal interviews and supported by the informal conversations held with other salmon skippers and deckhands.

It is important to recognise that there are both direct and indirect readings of reallocation at work here. The trollers understand the Coho Crisis as a reallocation of coho. They participated in a targeted coho fishery, and thus lost direct access to this species. The sports sector also targets coho, and the trollers perceive the recreational fishers' access to be less affected by conservation meas-

ures; trollers also perceive that recreational fishers benefit from the closure of commercial troll activity. This is a direct reading of reallocation. Similarly, First Nations commercial fishermen also talk about a direct reallocation. When asked about where the reallocation of fish was going, they indicated the sports fishery. When queried about other fishers' perception that fish was being reallocated to the First Nations fisheries, they replied that First Nations don't use a lot of coho -- they prefer sockeye.

Seiners and gillnetters on the other hand, perceived an indirect reallocation of fish. It was not coho, but rather sockeye that they saw as being reallocated to First Nations fisheries. The Coho Crisis resulted in restricted fisheries on all species where coho might be encountered as a by-catch. The sockeye fishery was severely restricted in both access and practice, in order to avoid coho mortalities. The associated buybacks removed considerable sockeye-fishing effort from the commercial fishery. The seiners and gillnetters understood their restricted access to sockeye as benefiting First Nations fisheries for sockeye. Sockeye was perceived to be the motivation of reallocation, coho was simply the tool.

Furthermore, these understandings of reallocation do not simply reflect the restricted fishing access during the first seasons of the coho conservation measures. Fishermen understood the reallocation processes that were initiated by the Coho Crisis as gradual and incremental. The Coho Crisis restricted fishing opportunity over both the short and long terms. It changed fishing practices for the long term, and transformed the future of both fisheries management and fisheries practice. These changes forced and/or encouraged many people out of the industry by way of the license buybacks. The fishing effort retired by the buybacks could be allocated to other sectors by the government.

Fishermen also recognised that the Coho Crisis instantly achieved a major cutback to fishing opportunity. Pre-1998 levels of opportunity and access have not been restored, despite perceived conservation successes. Fishermen initially understood the restrictions to be meant as temporary and the permanence of the cutbacks to opportunity are now associated with permanent reallocation.

## **The Distribution and Differentiation of Fisheries Knowledge**

The perceptions of the commercial fishers regarding the Coho Crisis reveal that fishers' knowledge of this issue is differentiated by gear type and ethnicity. Their understandings are shaped by their particular positions in the industry and the specific experience of resource competition that is most significant to their fishery. This differentiation of political knowledge, the way that it is situated and positioned, has major implications for both fisheries knowledge research and resource management.

This case study contributes to a growing traditional ecological knowledge / local ecological knowledge (TEK/LEK) literature on the way in which different people hold different knowledge. The fact that ecological knowledge is not evenly *distributed* between members of any given society or community, has been noted by many contemporary researchers (see for example Johannes 1981, Felt 1994, Ruddle 1994). Researchers have come to understand that the distribution of knowledge is 'segmentary' (Ellen and Harris 2000:5) and 'fragmentary' (Sillitoe 2000:4), and that knowledge does not exist in a totality, even within small

communities. Various literature on alternative knowledge has identified a number of individual (personal) attributes as well as social or status attributes, that effect the distribution of knowledge (see Grenier 1998, Neis et. al. 1999).

Understandings of knowledge differences have been developed in the context of applied research which generally seeks to document the details and extent of traditional resource use. The original focus was thus on *distribution* as a methodological issue that impacted the comprehensiveness of the data collected. Fernandez relates gender specificity of knowledge to the division of labour and suggests that men and women may have 'different knowledge of similar things, different knowledge of different things, different ways of organising knowledge, different ways of preserving and transferring knowledge' (1994:2). The recognition that women hold different knowledge than men, or that Elders' knowledge differs from that of younger, apprenticing harvesters has allowed applied researchers to refine their project designs to cope with the breadth of community knowledge.

This focus on distribution works from an assumption that women know different *facts* from men, facts that complement and supplement male knowledge, or that Elders know more, or more about the past, than younger people, whose knowledge is more detailed regarding current environmental conditions. This reflects an understanding of TEK as the composite of the skills and knowledge of a whole community, based on their different types of involvement in land or resource use activities. Essentially, the literature on the distribution of knowledge suggests that community members with different experiences of resource use each hold part of the greater whole that forms the TEK of that community. Each individual's resource use experience (past, present, male or female, in particular areas, with particular species) provides part of the overall picture. Researchers must thus take care to consult a variety of collaborators in order to document the breadth and totality of community knowledge.

More recently, this understanding of knowledge distribution has been expanded upon to attend to the *differentiation* of local knowledge. Whereas the distribution of knowledge relates to the way individuals know diverse things, the differentiation of knowledge relates to the way individuals know divergently. The former assumes that individuals with different experiences may know different facts. The latter understands that individuals in different positions may have very divergent understandings.

A focus on the differentiation of knowledge reflects greater attention to the issues of power, politics, and inequality within communities. Sillitoe has indicated the need to pay attention to internal power dynamics, and assess the variations of knowledge and social position (1998:233). Gaventa and Cornwall note the danger of reifying local knowledge and treating it as singular; greater attention is needed to the positionality of research participants (2001:74). Nygren emphasises the need to analyse local knowledge as 'highly situated ways of knowing, that have been subjected to multiple forms of domination and hybridisation' (1999:270). Her research in the rainforests of Nicaragua found that local knowledge could not be separated from peoples' competitive positions and their historical practices (Nygren 1999:279).

Nazarea has explored these issues in regards to ecological knowledge in the Philippines. She looks at the extent to which landscapes are ideologically constructed – how different lenses of ethnicity, gender, and age, affect the way in

which different people view the biophysical landscape (1996b:92). 'What we are dealing with in every aspect of resource management is people's sense of place -- the lenses through which they construct the environment and estimate their latitudes of choice and opportunities for challenge and refutation' (Nazarea 1999:105). Her conclusion is that 'disposition is very much a product of position' (Nazarea 1999:103).

Knowledge does not always vary individually. Anthropologist Miriam Wells' research with strawberry farmers in California revealed the way in which the interrelationships between economic and sociocultural variables create distinct 'knowledge systems' in the industry (Wells 1991:741). These knowledge systems, which are differentiated for Japanese, Mexican and Anglo strawberry growers, are distinct in structure (social networks) and content (management styles) (Wells 1991:743). The differentiated knowledge of the three groups results in different decisions that affect levels of capitalisation, forms of production and the use of scientific information. Wells concluded that farmers vary systematically by ethnic group rather than randomly by individual farmer in their 'evaluative perspectives, constraints and resources' (Wells 1991:766).

Within fishing communities specifically, there has been research that indicates the multiple differentiations of fishers' knowledge. Gatewood and McCay's survey of levels of job satisfaction among commercial fishers captures the nuances of differentiation within a fishing fleet. Their research points to the ways in which different fishers (by species and gear type) enjoy different aspects of fishing (1990:23). Their perspectives are very much differentiated by position within the industry. Maurstad has identified the way in which fishing practice, and thus fishing knowledge, is intricately related to the very individual aspects of each fishing enterprise. Boat length does not provide an adequate basis for estimating fishing effort because actual capacity is related to material attributes such as debt load, but also to personal characteristics such as industriousness. Fishing effort and experience is thus determined by a needs base that is broader than basic capitalist orientations (Maurstad 2000:42). Maurstad's research suggests that what fishers know about fish will ultimately be related to both economic position and personality. This work also underscores the differences between individual enterprises, the way that fishers are relatively positioned within a fleet and also within a broader political economy.

The way in which fishers' knowledge is differentiated has been dealt with in particularly useful ways by researchers in Newfoundland. Lawrence Felt successfully fleshes out these issues in his discussion of the social construction of knowledge among Atlantic salmon fishers. Felt argues that the successful utilisation of fishers' knowledge lies in 'understanding the processes and context within which local knowledge is produced' (1994:253). He suggests that articulations about resources must be deconstructed to illuminate how such conclusions are constructed by external factors such as experience of imposed management restrictions, competition for the resource and degree of political participation. Quotas eliminate a fisher's ability to detect stock depletion (Felt 1994:270) and union members feel pressure to echo union position (Felt 1994:276); such factors have significant influence on a fisher's description of the health of a salmon run. Felt concludes that the more regulated, commercial and competitive a fishery is, the more important an understanding of the contexts and social construction of user knowledge becomes.

Many of these traits of differentiation relate directly to ecological knowledge, and when we move to a focus on political knowledge, the categories of differentiation become even more multiple and contingent. Davis and Bailey (1996) documented the different attitudes of crew and owners to limited entry licenses (LEL) in Nova Scotian fisheries. They found that these differences reflect 'concrete divisions in the material and social experiences of [limited entry]' (Davis and Bailey 1996:252).

Palmer and Sinclair investigated fishers' opinion regarding fleet rationalisation in Newfoundland. They found 'divided knowledge' within the community of fishers; large vessel operators believed in the need for fleet reduction, and smaller boat owners wanted to see more vessels participating in the fishery (1996:275). They concluded that 'local knowledge of the sociopolitical landscape needs to be studied before the local knowledge of the environment can be properly incorporated into the formulation of co-management programmes' (Palmer and Sinclair 1996:276). While these authors recognise the significance of political knowledge in commercial fishery contexts, their conclusion remains focused on a successful way to access ecological knowledge. Political knowledge is considered as an influence on ecological knowledge. I contend that it is important to engage with political knowledge as a local theory, as a local critique of dominant structures of resource management and as a basis for decision-making.

Diversity has tended to be approached as a methodological issue within ecological knowledge research. Variations in local knowledge due to gender, age, etc. must be attended to and documented by stratifying the sample of informants within the community (see, for example, Grenier 1998, Neis *et al.* 1999a). The 'interest contortion' (see Holm 2003) must be factored out by assessing the political influences that cause variations in ecological knowledge. However, I would argue that diversity of knowledge is a conceptual issue, not a methodological one. The differentiation of knowledge, its situatedness and positionality, should be a focus of social science research, not a complication to it.

The key issue is thus not whether fishers are 'right'; we must recognise the multiplicity and heterogeneity of local knowledge 'that emerge[s] out of a multidimensionality reality in which diverse cultural, environmental, economic, and socio-political factors intersect' (Nygren 1999: 292). If the value of local knowledge is in its relation to direct experience, the variety of human experience, even in small 'localities' must be recognised. This does not decrease local knowledge's relevance to resource management, but rather, provides a new premise for its use: informing regulatory structures regarding the important nuances of resource users' experiences, concerns, and needs.

Local knowledge is not simply ecological and it is not just a source of resource management alternatives. Local knowledge is the product of individual and community interaction with wider structures and processes, and informs both people's everyday choices and their life decisions. Or as Roepstorff suggests, knowledge simultaneously exists at the two interfaces between people and their (natural) surroundings and between different partners -- in a politicised arena of power (2000:165-6). Workers in a natural resource economy are located between a local resource base and a wider net of economic and political forces. They have knowledge of both these spheres, which informs their decision-making. Fishers have well-developed understandings of the politics of resource management and interpret government policies according to these understandings.

Local knowledge is not merely that which informs resource workers' livelihoods and their daily interactions with their natural and social environment. Local knowledge is what informs debates over environmental issues and social values. The politics of local knowledge are implicated in, and created by, a broader political economy and broader fields of power.

I suggest that the focus on fishers' knowledge as only ecological is limiting and less productive than a more expansive approach informed by anthropological understandings of the multiplicity of knowledge and its interconnection in human experience. Fishers' understandings of the Coho Crisis suggest the importance of dealing with the political *content* of knowledge claims, to investigate the nature of fishers' divergent interests and to determine the implications of both. The political knowledge of fishers is intertwined with their ecological knowledge, but it is not simply the 'background noise' that complicates LEK research. This knowledge provides important information about how fisheries work and how communities function. Understanding how fishers understand the Coho Crisis – what they think it was 'really' about and how that reflects the contemporary context of competition for access to salmon resources – is critical to the success of future conservation initiatives.

## Conclusion

*It feels like a dirty trick. They chopped the fleet in half and then didn't let us fish.*  
(Luke, gillnetter)

More than six years have passed since Minister Anderson announced the Coho Crisis and the conservation measures that would transform the salmon fleet and the practice of salmon fishing. The northern trollers have regained access to a targeted coho fishery, suggesting some level of conservation success and a return to pre-1998 'normalcy'. However, the commercial salmon fleet is much reduced and embittered, and overall, fishing opportunities are still restricted. The legacy of the Coho Crisis is thus both practical and ideological. Fishers' perceptions of the collapse of coho conservation priorities into DFO salmon allocation objectives have persisting impacts on fisher responses to new conservation measures. Restrictions on commercial sockeye fishing in the southern areas in 2002 due to concerns about the near extinction of Cultus Lake and Sakinaw Lake sockeye stocks were linked by fishers to salmon reallocation to Aboriginal fisheries on the Fraser River. Fishers protested these conservation measures and won their court case based on a defence focused on reallocation (*R. v. Anderson*). In the north, area closures for the troll fleet are often understood to be initiated at the request of sports fishing lodges on Langara Island (Queen Charlotte Islands). Most, if not all, DFO conservation initiatives and risk-averse management efforts trigger fishers' distrust and suspicion.

It is not beyond the realm of possibility that the Coho Crisis was in fact used as a means of reallocating fishing opportunities between competing sectors of the fleet. Finlayson and McCay note that after the collapse of the East Coast cod stocks, chaos and fear were exploited by government to impose a fishery restructuring policy that had been developed a decade before (2000:312). However, whether the Coho Crisis was an opportunistic use of a legitimate conserva-

tion issue for political ends, or merely a coincidental stock of concern during a decade of reallocation and fishery restructuring, is not the critical issue. False or true, coincidental or deliberate, the Coho Crisis is, for all the commercial fishermen I spoke with, wrapped up in the politics of allocation. They understand the conservation measures in light of the larger issues of intersectoral competition and gear conflicts. This has significant implications regarding selectivity compliance for this fishery, and future biodiversity objectives. The Coho Crisis was extremely damaging to the legitimacy of DFO conservation initiatives for commercial fishers.

The Coho Crisis provides a finely detailed example of the differentiation of fisheries knowledge and of the way that knowledge is ultimately positioned. Not only do fishers know different things about fish because of their different experiences of fishing, their diverse positions within the context of resource competition shape their understandings of political processes. This example of differentiation of political knowledge by ethnicity and gear type does not reflect the only way in which fishers' knowledge is subdivided. Fishers' understandings of quota-based management in the BC halibut fishery have proven to be differentiated by generation and access to capital.

Finally, the Coho Crisis illustrates the political nature of fishers' knowledge. Not only do fishers know things about coho, they know things about coho conservation measures. They have well-developed (although varying) theories regarding the management of the salmon fishery and the relationship between biodiversity and user-group competition. Their understandings about the politics of resource management influence their responses to, and participation in, conservation initiatives. This type of influence works on both large and small scales of behaviour. Understandings about salmon reallocation influenced both fishers' decisions to sell their licenses in the buybacks and their decisions about whether to use their revival box to resuscitate coho or to store excess gear.

Local knowledge is political, and its political aspects have been chronically overlooked by social science research. Ecological knowledge researchers have recognised the political influences upon local ecological knowledge, but have failed to meaningfully investigate the political aspects of local knowledge. Commercial fishers know important things about fish, but they also know about fisheries, and this political and politically constructed knowledge warrants academic analysis.

To successfully manage fisher behaviour, one must fully grasp the understandings which inform fishers' strategies and activities. Management initiatives that do not attend to power dynamics or recognise their own political implications tend to further alienate fishers from the management system. Current issues of legitimacy and compliance cannot be resolved without meaningful engagement with the ways in which fishers experience and perceive regulation and management.

## Notes

<sup>1</sup> Names have been changed to protect the anonymity of research participants.

<sup>2</sup> Non-retention requires that the identified species be released live at the point of capture; no coho were to be retained and landed in any recreational or commercial fisheries.

<sup>3</sup> The friendly relationship between Fisheries Minister Anderson and major fishing lodge interests has been criticised by commercial fishers, especially after yellow coho zones were designated around the large lodges on Langara Island, north of Haida Gwaii.

<sup>4</sup> The fishing women with whom I spoke prefer to be referred to as 'fishermen'. Several of them indicated that they like the history associated with this term, and their desire to be *included* in this category rather than creating a feminised version of it. None of the research participants liked the gender-neutral term 'fisher' because that word also refers to a 'rodent'. (Note: the fisher is not in fact a rodent according to biological classifications). Throughout this paper, I do use the term fisher to refer to commercial fish harvesters in general, and groups that include fishing women who I do not know or with whom I have not discussed preferred labels. However, where I am referring to male individuals, all-male groups, and individuals or groups which include women who have indicated their preference to me, I use the term 'fishermen' to reflect their preference.

<sup>5</sup> The relative economic evaluations of the recreational and commercial salmon fisheries are often commented upon and critiqued by commercial fishermen. The way in which the value was calculated is called into question. Specifically, several fishermen have suggested to me that the value of the commercial fleet was omitted from the calculation, whereas every sports boat added to the economic value of recreational fishery.

<sup>6</sup> The 1996 intersectoral allocation set the gear allocations at 34% gillnet, 24% troll, 42% seine.

<sup>7</sup> There are currently 721 gillnet, 168 troll, and 110 seine licenses registered for the northern fishing areas surrounding Prince Rupert.

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