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"ORTHODOXY AND THE THEORY OF FISHERY MANAGEMENT"

The Policy and Practice of Fishery Management Theory Past and Present

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**A Thesis Submitted to
the Faculty of Arts
in Partial Fulfillment of
the requirements for the degree of
Masters of Arts
in Atlantic Canada Studies**

**Saint Mary's University
Halifax, Nova Scotia
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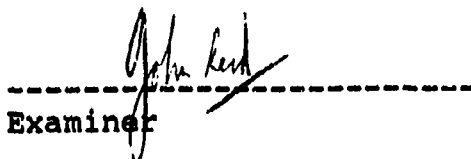
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To whom it may concern:

This is to state that the two maps (1) the NAFO Stock Areas, and (2) the Scotia-Fundy Region, included as Appendix D in the Masters thesis written by Ralph K. Bannister entitled "ORTHODOXY AND THE THEORY OF FISHERY MANAGEMENT" The Policy and Practice of Fishery Management Theory Past and Present, are standard maps widely used by the Department of Fisheries and Oceans, which we have made available in many public documents including press releases and backgrounders. I see no copyright complication in his using these maps.



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ABSTRACT

The thesis argues that the dominant theories of fishery management are rooted in an orthodox paradigm or perspective that favours the more powerful industrial interests over the less powerful community based interests. The orthodox theories are assumed to be neutral, objective and value free, but in reality are biased, selective and opinionated. The thesis outlines the development of fishery management theory from the second half of the 19th century to the present and shows the consistency of the underlying assumptions and values which support them. The thesis reviews the liberal critique of orthodox theories made by welfare economists and maritime anthropologists during the 1970s and 1980s and shows that despite these criticisms, orthodox theories continue to dominate as the most legitimate basis for managing the fishery. The thesis compares the fishery management structures, policies and practices of Canada and United States and shows how the theory when it is translated into policy either does not solve fundamental problems (Canada) or cannot be fully imposed on fishery participants (United States). The thesis examines an alternative paradigm for understanding fishery management problems and concludes that a political

economy approach offers new research and policy formulation directions that could lead to more appropriate theory and policies.

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CHAPTER ONE

Introduction

Most differences between economists and between economic models result from political differences in which fundamental cultural values and philosophical arguments are involved. All models have their own associated ideologies as these sets of values are termed (Barrett Brown, 1984:9).

Various aspects of the fisheries have been studied over the years by many scholars working within different disciplines (Lamson and Reade, 1987). Historically the bulk of the theoretical literature on fisheries management has developed within an orthodox paradigm which views society as functionally integrated and social change as evolutionary. This paradigm is based on certain assumptions and values that see scientific research as neutral, objective, and value-free (see Kuhn, 1970). The orthodox paradigm has structured a dominant perspective¹ that determines what should be investigated, appropriate methodologies, theoretical models, and policy applications. This perspective has not only restricted the definition of fishery management problems historically, but has also limited the range of potential solutions open to the industry.

¹The dominant perspective in this thesis will be referred to as the orthodox perspective. Other descriptions found in the literature and used to categorize this perspective include traditional, mainstream or classical.

A management crisis in many of the world's fisheries has called into question the adequacy of the orthodox perspective. Nevertheless, most fishery problems and crises continue to be addressed from this perspective; it continues to dominate the thinking of fishery management approaches at all levels of analysis.

As fishery managers attempt to put theories based on this perspective into practice, they are forced to confront the everyday realities of the fisheries, realities that are generally ignored by orthodox perspective theories. Yet the continuing hegemony of the orthodox perspective prevents serious consideration of alternative perspectives that view problems and solutions differently. The orthodox perspective continues to define the objectives for today's management systems and underlies the policy and practice processes for management strategies.

This thesis aims to show that the orthodox perspective is inadequate to the task of providing a sound basis for effective fisheries management. I argue that the orthodox perspective is inadequate because in its theoretical explanation it defines fisheries problems and solutions too narrowly, and it fails to address the wider political, cultural and economic context within which problems exist. It ignores the distribution of the resources and benefits between fishery sectors such as inshore and offshore, large and small companies and between industry and fishing communities. Moreover, I argue that the orthodox perspective is biased toward key economic interests. While the theory that is based on this perspective is normally seen as neutral, objective and scientific in reality one finds that it is somewhat biased, selective and opinionated.

This view is based on my findings that most fishery management theory emphasizes economic productivity and efficiency criteria over other potential benefit measurement criteria. By only using this narrowly based criteria for addressing problems, orthodox perspective theory implicitly favours some interests and sectors of the fishery over others, in particular, large over small fishing interests and industrial interests over community interests.

In Chapter One I show how the orthodox perspective theories have developed historically. While theory within the orthodox perspective is always presented in neutral, objective, and scientific terms (i.e. developing rational solutions to specific problems), in fact, the questions raised and solutions posed have been biased to a great extent as simply responses to the particular concerns of the more powerful fishery interests. Because of these biases one finds that the entire fishery management history is cloaked in an ideological shroud.

Chapter Two shows how changing political and economic conditions during the early 1970s caused by the management crises in many of the world's fisheries gave rise to greater interest in fishery management theory. Scholars working from disciplines other than fishery biology and neo-classical economics, began to argue that traditional bio-economic theories were either too simplistic or misleading. The new critiques of traditional theories led to different kinds of questions and different types of solutions to fishery problems being raised. Nevertheless, the traditional theories have continued to remain dominant by either incorporating minor criticisms into their analysis or ignoring more fundamental criticisms.

Chapter Three provides case studies of two countries that subscribe to the same orthodox perspective of fisheries management - Canada and the United States. It shows that in developing their management systems each country faced quite different political, economic and cultural conditions. These conditions have in turn resulted in each management system developing quite differently. The differences in the two management systems have had a significant effect on the way in which the shared fisheries management objectives have been translated into policy and practice.

Chapter Four illustrates the problems faced by fishery managers in Canada and the United States as they attempt to translate orthodox perspective theories into policy and practice. The limitations of the orthodox perspective become clear as fishery managers attempt to develop and implement policies in different political, economic and cultural contexts. It shows how fisheries problems and solutions can only be defined in terms of the realities of peoples everyday lives and in relation to historically specific national and regional concerns and interests.

Chapter Five outlines the political economy approach which presents a different paradigm and perspective from which to assess the problems of the fishery. It emphasizes the importance of the way the fishing industry is organized, power is distributed among sectors, and the role played by the state. While it also has its limitations, the political economy perspective is shown to address in more realistic terms many of the problems confronting the fishery.

The thesis concludes that a new perspective of fishery management

is necessary if fishery problems are to be effectively addressed. To progress, a new model for defining fishery problems and solutions has to replace the orthodox paradigm and perspective. The key problem to overcome has been, and continues to be, the pervasiveness and unquestioned acceptance of the dominant orthodox perspective which continues to block or limit the emergence of a new perspective within which new theories of fishery management can develop.

CHAPTER TWO

The Orthodox Paradigm of Fisheries Management

1. Introduction

This chapter traces the development fishery management theory from the last half of the 19th century up to its neo-classical economic antecedents in the 1950s and 1960s. I show how orthodox perspective theories have historically maintained their hegemony for defining fishery problems and solutions. That is the orthodox perspective understandings of the fishery are justified as simply products of evolving scientific research and knowledge which is both objective and value-free.

I challenge this understanding by showing that the development of management theories have historically focused only on the biological and economic dimensions of the fishery. I show that this narrow focus has reflected and supported the concerns and interests of the industrial fishing sector, while overlooking and downplaying the concerns and interests of the traditional sectors, as well as other important fishery dimensions (i.e. the ecological, cultural and political).

I describe and categorize the development of orthodox perspective theories as historically going through four distinct phases; the fishery as an inexhaustible resource (1850-1900), the fishery in ecological equilibrium (1900-14), the over fishing problem (1918-45) and the fishery as a common property (1950-60).

Each one of these phases can be shown as focusing almost exclusively on the problems of production which were the concerns of the emerging and later dominant industrial fishing sector, rather than the more generalized problems of either the resources themselves or the traditional participants and communities most dependant on them.

The orthodox perspective theories continue to provide the primary focus, direction and range of policy alternatives used for managing fishery resources at the present time. Understanding historically how the concerns of the more powerful interests have been reflected in the theories is important if alternative perspectives and fishery management theories are to emerge and develop.

2. The "inexhaustible fisheries" approach of the 19th Century

Prior to the last half of the 19th century, fish stocks were generally assumed to be abundant. The formal study of fish was concerned with conducting empirical observations and taxonomic studies of freshwater and anadromous species (Graham, 1948:10). Nevertheless, records indicate that many fishing restrictions had been legislatively enacted in many countries at this time. These restrictions were designed to protect specified fisheries and specific locations from the use of certain gear and from fishermen who were outsiders.¹ Britain alone, in the middle of

¹ History appears to be full of incidents when restrictive measures have been imposed on new technologies. Peter Pearce, recounted that in the course of his study of fisheries regulation in the Mediterranean fisheries that he "chanced upon an ancient French document that described prohibitions on paired trawling (chalut-boeuf) on the Mediterranean coast in 1724, and restrictions on the use of trawl nets as early as 1681 (Pearse, 1980:11).

the century, had over fifty parliamentary laws that restricted and controlled fishing operations.

The first formalized and recognized rationale for a theory of fishing began during this period in Britain. In 1866 a Royal Commission began a process of deregulating the British fisheries by recommending to Parliament that all the laws restricting fishing be repealed. The Commission members, using the general notion that fish stocks were inexhaustible, felt that the existing restrictive laws were holding back the fishing industry's ability to develop and expand production. The regulations were repealed and the fishery resources were now available for unrestricted exploitation (Russell, 1942:14).

Once the restrictions were removed the fishing industry was free to use the revolutionary new industrial methods and technologies of the age to expand fishing operations and supply the increasing market demands of an industrializing Europe. These new markets along with the lifting of restrictions on fishing gear types resulted in a rapid transformation of the industrial structure of the fishing industry. For example, icing of catches at sea began in the 1860's, the beam trawl was developed for groundfish fisheries in 1865,² steam engines were introduced on fishing vessels in 1881, and otter trawl technology was pioneered in 1894 (Russell, 1942). The industrial transformation was occurring throughout all the fishing fleets and areas in Northern Europe.

In addition to the industrial transformations underway,

² The beam trawl was first developed for use on sailing vessels and later was used on steam vessels, but from 1894 onwards this (method) gave place to the more efficient otter trawl (Russell, 1942:13).

organizational innovations were also dramatically changing the social structure of the fishing industry. For example, there was an increase in the concentration of ownership and decision-making in the hands of non-fishermen (Anderson, 1979:16)³. All of these changes made fishing operations more productive and efficient at the vessel and firm level of operations. At the level of the fishery resources however, the effect was not efficient or productive since the traditional fishing areas became more crowded and appeared to be producing less fish.

Soon changes began to be noticed on the fishing grounds as fish stocks began to manifest dramatic fluctuations in population levels. Even though the more mobile fleets were able to move to newly found and more distant fishing grounds, controversies began to arise "as to whether or not the amount of a given kind of fish which man is able to take from the sea is sufficient to have any noticeable effect on the supply" (Schaefer, 1957:669). It was becoming clear to both the industrial fishing interests and many small boat local fishermen that the theory that the fishery resources were "inexhaustible" and not affected by fishing activity would have to be reconsidered (Smith, 1987:4).

Political pressure from those who were concerned about the effects of the new fishing methods forced fishing nation governments to take some action (Russell, 1942:106). By the late 19th century government boards of inquiry were being set up to examine and make recommendations on the

³ An interesting historical point is the slow industrial development of the fisheries in comparison to other sectors of the economy. For example the British fisheries were industrializing some 50 years after the British economy itself had peaked (Anderson, p.16).

state of the fisheries. Scientific expeditions to study the marine environment were funded and organized. Biological research laboratories were founded in order to study the marine resources. And international agencies such as the International Council for the Exploitation of the Seas (ICES) were established as a means of dealing with conflicts between fishing fleets on international waters (Russell, 1942:107; Smith, 1987:4).⁴ The resulting scientific mandate was to find out the reasons for the drastic stock fluctuations and to determine the effects, if any, that fishing has on them.

It was within this context that the beginnings of present day theories of fishing appeared. The first debates in the literature centred on whether fishing had any effects on fish populations at all. On the one hand, T.H. Huxley, the great Darwinian naturalist, and W.C. MacIntosh, the well-known Scottish fisheries biologist, argued, in separate articles published in 1883 and 1899 respectively, that the sea was inexhaustible and therefore restrictive fishing measures were unnecessary. For example, Huxley stated that,

it may be affirmed with confidence that, in relation to our present modes of fishing, a number of the most important sea fisheries, such as the cod fishery, are inexhaustible. An I base this conviction on two grounds, first, that the multitude of these fishes is so inconceivably great that that the number we catch is relatively, insignificant; and, secondly, that the magnitude of the destructive agencies at work upon them is so prodigious, that the destruction effected by fishermen cannot

⁴ For example, in Britain, the Trawling Commission reported in 1885 (20 years after the Royal Commission) of evidence of stock "diminution" in inshore waters, the industry itself between 1883 to 1892 pressed the government to protect coastal fisheries, scientific investigations of trawl fishing had begun in Scotland by 1895, and the International Council for the Exploration of the Sea was founded in 1902 by the fishing nations of northern Europe (Russell, 1942:107).

sensibly increase the death-rate. (quoted in Graham, 1948:34).

On the other hand, a newly-hired government biologist, T.W. Fulton (1896), in his trawler studies for the Fishing Board of Scotland, had determined that, "the rate of fishing was surprisingly high, sufficient to make it likely that stocks would not prove inexhaustible" (Graham, 1948:45-46). Following the same argument and in response to the Huxley/MacIntosh thesis, William Gartang, another well-known biologist, conducted more experimentation and re-evaluated previous research in order to confirm Fulton's position in 1900. By the end of the century, as a result of such high profile debates, it was generally understood by researchers that fishing activity might not only affect the abundance of commercial marine fish but also the complex interactions of other non-commercial species (Smith, 1987:10).

In the 19th century the approach which initially saw the marine resources as "inexhaustible" was effectively used to legitimate the industrial transformation of the fishing industry. As a result of excessive fishing, however, both the industry and dependent fishing communities became quite concerned about the continued supply of fish. This concern resulted in pressure for scientific research into the relationship between fishing effort and the continuing supply of fish. As we will see later, this particular formation of the problem forms a basic approach which continues up to the present day in orthodox fishery management theory.

3. The "ecological equilibrium" approach: 1900-1918

By 1900 it was recognized that the introduction of industrial technology into the fisheries had affected and changed the commercial fish stocks. Fishery scientists began collecting data on fishing fleet activities and operations in order to determine the extent of these changes. This resulted in detailed resource surveys and studies beginning to be conducted throughout Europe during this period (Gulland, 1974:47). The limited availability of relevant statistical information, and the absence of any proven analytical framework within which to determine the effects of fishing on fish stocks, limited the scientific understanding of the processes underway within the fisheries. As a result, an intuitive understanding that saw natural resources in ecological equilibrium arose. Russell wrote of this period that,

in the early days of fisheries science most workers thought that the main thing to aim at was to keep up the supply of mature fish, so that an abundant supply of eggs and larvae young fish might be assured" (Russell, 1942:71).

The general approach to fisheries at the time was, according to Baranov,

the natural stock of fish is the untouched capital of which only the annual interest, leaving the capital untouched, should be taken advantage of by the fishing industry. (Baranov, 1925:7).

Thus the accepted theoretical approach was that the fishery resources were in a state of natural or ecological equilibrium in the marine environment.⁵ It was now generally assumed (as was the case in

⁵ T.D. Smith points out that the beginning of this approach can be cited as early as 1884 when Ray Lankester was arguing against the Huxley inexhaustible position by writing "that any removals of fish from the sea had an impact [on populations], if not directly then indirectly by removing potential parents of young fish. These young fish were not 'superfluous' as Huxley has implicitly argued, but had "a perfectly definite place in the complex interaction of ... living beings" (Smith, 1987:5).

agriculture) that a natural fish stock would, in any given year, produce a surplus that could be harvested without damaging or affecting either the overall population or the equilibrium of the environment.

Based on this ecological equilibrium understanding of fish populations, E.W.L. Holt's 'propagation theory' argued that every individual fish in a particular population should have the opportunity to spawn at least once.⁶ Danish biologists Peterson and Garstang, writing between 1900-1905, used growth or thinning fishery theories to argue that fish may be too plentiful for available food and so fishing can have beneficial influences.⁷ Later, in 1908, working from the ecological equilibrium approach, Hjort introduced the idea of determining population age distributions as a means for understanding the fluctuations of fish stocks (Russell, 1942:55). Smith (1987) summed up Hjort's contribution to the theory of fishing as follows:

Hjort provided one answer to the question that had been plaguing fishermen and politicians for centuries: why do the catches vary? Hjort's conclusion was very important theoretically and practically. Theoretically Hjort's observation suggested that the size of fish populations may be determined by processes occurring at very young ages. This suggestion would help focus future research for many years. Practically, Hjort's results would provide "a method of predicting the probable future course (and hopefully the yield) from year to year of some of our most important fisheries.(24). (Smith, 1987:24)

⁶ This theory still underlies many of today's fisheries regulations for controlling fishing effort. For example, the Canadian lobster and salmon fisheries regulations can trace their roots back to Holt's ideas.

⁷ Peterson was also well known for his work in studying fish migrations and developing fish marking techniques such as the disk tag (Smith, 1987:16).

The ecological equilibrium approach provided the framework for the development of fishery management theories: the need to thin stocks, to protect spawn, eggs, larvae, and to determine future yields. In effect, this approach again suited the interests of commercial harvesters. By ensuring that the ecological equilibrium of a fish population was preserved the theory argued that the fishery would continue to be productive and support a viable industry. This approach to fish stock dynamics stated that fish harvesting could have a positive effect on the stocks. Thus the "ecological-equilibrium approach" was compatible with the fishing industry interests as well as the economic interests of the nations within which fleets operated.

In 1905 we see the first introduction of economic factors into mainly biological theories of fishing. In a paper entitled the "Statistics of the North Sea Fisheries", H.M. Kyle, enlarging on the ecological approach, separated out two important elements involved in a fishery. The first element was biological. Kyle, following Peterson's theory, felt that, depending on the amount and size of fish caught, the population and the catch of a fishery would eventually stabilize based on the "natural laws of nature". The second element was economic, or 'rational fishing', to use his term. This concerned the "monetary side of the matter, the expenditure in boats and gear on the one hand and gross and net income on the other". Kyle perceptively concluded that these economic factors determine the fishing effort, which in turn determine the size of the stock population. He further speculated that "a good mathematician might be able to calculate the precise point where 'over-

fishing' begins" (quoted in Smith, 1987:13).

Although some writings, such as Kyle's, began to show theoretically that other factors, such as the organization of the industry itself, affected the ecological-equilibrium of fish stock populations, the impact of these factors did not seem to be fully considered until after World War I. The main reason being that the mobile trawl vessel sector was able to develop and continually expand their production by exploiting newly-found fishing banks farther away from the depleted traditional fishing areas. The ability to maintain productivity and profits through continually expanding the range of operations tended, at least to some extent, to mask the economic reality of stock depletion. As a result the fishing industry did not encourage or support any restrictions on fishing practices other than purely scientific efforts directed at understanding the ecological equilibrium of fish stocks and the potential production levels from them.

The lack of a practical and predictive theory of fishing that went beyond the ecological-equilibrium understanding, along with the ability of the industrialized fleets to expand their production, slowed any real consideration directed toward controlling the overall fishing effort placed on the resources. This lack of control was becoming more important as international disputes began to occur on the high seas between competing fishing fleets of different countries (Smith, 1987:13). Many European governments began providing public funds to support the formation of international organizations dedicated to studying fishery problems extended beyond the control of any one country. For example the International Council for the Exploration of the Seas (ICES) was founded in 1902, after King Oscar II of Sweden had convened in 1899 a preliminary

conference in Stockholm (Graham, 1948:49). The main reasons for having ICES was to facilitate the sharing of scientific information between nations and to conduct consultations directed towards resolving fishing conflicts on the high seas.

By this time the fishing industries in most European fishing nations had become heavily dependent on the fishery resources. Their concern about the state of the resources was particularly acute because of the apparent limited opportunities for expansion due to new fishing grounds, the increased competition between fleets for the known available resources, and heavy capital investments already held in the industry. These concerns greatly influenced the direction that scientific research took in developing new theories of fishery management after the war.

4. The over-fishing approach: 1918-1945

The commercial fish stocks of the North Sea, after the four-year period of forced fishing inactivity during World War I, had made remarkable recoveries in population levels. A 1923 report submitted to the International Council for the Exploration of the Seas (ICES), showed that not only were catch rates up over 100%, but that the average catch of larger fish was higher.⁸ This clearly pointed to the relationship

⁸ This report resulted in a committee of ICES, the Plaice Committee, recommending protection measures such as minimum fish size and nursery area closures (Smith, 1987:23). As Smith noted these recommendations were not accepted by countries fishing the resources largely because the fishery had improved so much. In fact, he points out that the numbers and size of vessels increased and eventually the catch rates dropped to pre-war levels.

between excessive fishing effort and stock depletion. This was now not only recognized by the researchers, but as already noted, began to be an economic concern for the highly capitalized industry and communities dependent on them.

Also during this period, in addition to fishing effort being seen as having a negative effect on fish stocks, the fishery resources themselves began to be conceived of as a "common property". Common property refers to the freely accessible character of a natural resource. This concept included the view that common property resources are doomed to over-exploitation and depletion by users, each of whom has no reason to restrict or conserve what might otherwise be caught by competitors.

Therefore after the first World War, scientific efforts turned, from determining the equilibrium mechanisms of the fish stocks to trying to quantify the effects of fishing effort on fish stocks. In Europe the first theory of fishing to show mathematically the effects of effort on a particular stock was proposed by the Russian scientist F.I. Baranov. He showed through the use of a mathematical model, that commercial fishing is an important factor in depleting a fishery. Specifically he pointed out,

that fishing and a natural stock of fish are incompatible, that the industrial stock of fish is a variable quantity, depending upon the intensity of fishing. The more fish we take from the basin, the less the basic stock of fish and the less fish we take, the greater the basic stock which approaches the natural stock as the fisheries approach non-existence (Baranov, 1925:7).

His model related the yield (catch) to population factors such as species, size, growth, and population abundance (Gulland, 1974:49)⁹. Baranov's work provided an important step in the development of a realistic methodology for determining the effect of fishing effort on a fish population¹⁰ and thus some measurable way to control over-fishing of the marine resources. The requirement for a general approach that could be used in a practical way for managing commercial fisheries and preventing over-fishing was first tackled by E.S. Russell in 1931. Russell drew together the various theories developed up to the time of his writing and proposed that:

the average catch per hour at any particular time is an index of the stock remaining on the grounds at that time. Therefore over a period of time, this index could be used to indicate both the average state of stock during the period and the amount of fishing being imposed on it (Russell, 1931:19).¹¹

Later, Michael Graham, an English biologist who also worked on many aspects of the over-fishing problem became very concerned about the nature

⁹ Baranov also "showed that catches much larger than equilibrium levels would necessarily be taken for a few years immediately after any substantial increase in fishing mortality rate" (Ricker, 1977:8). Ricker also wrote that this phenomena accounted for much of the nostalgia for the 'good old days' of big catches and easy fishing that commonly exists amongst fishermen (Ricker, 1977:8).

¹⁰ Unfortunately, Baranov's theory was published in an obscure place and time and as a result was not widely distributed until the late 1930's and 1940's (Ricker, 1954; Gulland, 1974:49).

¹¹ Russell's method was to examine factors that affect the size of harvestable populations over time. The factors that he identified, and expressed as absolute rates of change in the weight of the fish population, were recruitment, growth, natural death, and catches (Russell, 1931).

of the fishing effort on the resource. Writing in 1935, Graham felt that because:

fishermen must, if they are to be good fishermen, persist when stock fluctuations are against them. Consequently, they remain in business and fish as hard as they can, so long as anybody is getting a profit; so we continued in the same way for year after year in the 1920's and 1930's with only the fortunate few making a fair return for their capital and work (Graham, 1948:69).

This led Graham to develop what he termed the "Great Law of Fishing". This law states that "those fisheries that are unlimited (open access or common property) become unprofitable" (Pearse, 1980:14).

Again we see that a conception of fisheries as common property subject to over-exploitation was becoming an important underlying assumption in the theoretical developments. This was also a time when international agreements were being sought by fishing nations in order to control harvest levels. These international efforts also reinforced and illustrated the idea of the fishery resource as being common property. That is countries, given their historical fishing patterns were forced to seek ways to protect not only the resource from unrestricted fishing effort but their own rights to harvest the resource. In Europe, however, before any of these agreements could actually be acted upon the Second World War broke out.

In North America, interest in the fishery was directed by a different type of momentum than in Europe. By the late 1930's the conservation movement had reached its height. This social movement developed as part of a general reaction against the devastating impact that the industrialization process was having on the existing natural

resources. As a result, the fisheries, like all other natural resources, were being intensively researched and regulatory measures were beginning to be proposed and implemented in order to conserve them for the public good (Royce, 1965; Hayes, 1969; Larkin, 1977). The conservation of natural resources during this period had begun to be seen as a public policy matter in which questions about whether natural resources should be used immediately by society or whether they should be set aside for future use were being debated.

Therefore, as in Europe, the focus of research in North America changed from the ecological-equilibrium approach, with its focus on the natural balance of stock populations, to considering how to control short-term fishing effort to protect long-term economic interests. The new focus on over-fishing resulted in one of the first attempts to actually manage a fishery through specific restrictions on fishing activities.

This attempt to manage a fishery took place on the west coast of North America when the International North Pacific Halibut Commission (INPHC) was established in 1942. The mandate of this organization was to develop a scientific basis for co-managing the Canada-United States halibut fishery. Two scientists, Thompson and Bell concluded from their research in 1934 that the halibut fishery was facing depletion through too much fishing effort (Larkin, 1977:1).¹² Using their findings, the fishery was managed in both Canada and the United States by implementing fishing season closures. This development provided an example for the

¹² As a data source, Thompson during the course of the research project, pioneered the use of fishermen's logbooks. In fact he worked with fishermen in designing more complete logbooks and encouraged them to keep accurate records.

fisheries of Europe. As Smith (1987:30) points out, this "demonstration of the value of managing a fishery was closely watched" by the European biologists at the time.

5. The Bio-economic approach: 1945-1969

After World War II, new technology such as diesel engines, electronic navigation aids, sonar, deck machinery, and freezers ushered in a second major industrial transformation of the industry and the so-called modern era of fishing. In addition to technical innovations, fishery resources were now being harvested by long distant fleets which were fishing on a world-wide basis. Before long the new and increased fishing effort resulted in major fishery stock collapses throughout the world.

Murphy (quoted in Waugh, 1984) recounts the sudden collapse of the herring and sardine fisheries:

Three years after the peak catch of 1,723,000 tonnes, the Norwegian herring fishery was virtually destroyed with a small catch of only 24,000 tonnes in 1969. A similar decline in catch is described for the Pacific sardine fishery. In 1950-51 the catch was over 350,000 short tonnes, a figure it had rarely fallen below for 20 years, and then only marginally so. In 1952-53 the catch fell sharply to 15,000 short tonnes, and rose over the 100 mark only once in the next ten years (Waugh, 1984:65).

The stock collapses resulted in not only tremendous biological losses, but they had devastating economic effects on the fishermen, processing companies and dependent communities.

To those studying the fisheries, it had become apparent that if the fisheries were to be sustained biologically and were to ensure an economic future for those dependent on them, the harvest had to be not only effectively controlled but also effectively managed. Therefore, after the Second World War it was widely recognized that effective restrictions on effort were needed in order to protect the resource. However, the implementation of these controls had to be tempered by the reality that the fishery resource was economically important to the countries harvesting them. The fishery must be not just controlled, it must be managed. And management required that the relationship between the population dynamics of commercial stocks (biology) and the actions of the harvesting/processing industry (economics) had to be understood. Understanding this relationship became the focus for the development of the new theories of fishery management. These new theories in turn concerned themselves strictly with the processes of resource production and the economics of fishing them. For example, Dr. Martin D. Burkenroad (1953) in his paper entitled "Fishery Management as Political Economy" noted that:

... management of the fisheries is intended for the benefit of man not fish; therefore the effect of management upon fish stocks cannot be beneficial per se (Gordon, 1954:124).

In other words, the fishery should be managed not for the ecological benefit of the fish stocks but for the economic benefit of humankind and specifically, the fishing industry.

The 1950-1960 period represents what Larkin termed the "golden age" of biological fisheries theory development. The theoretical developments

in biology were now refocused to explain the relationship between fishing effort and the maximum biological yield from a fishery¹³. Ricker (1954:559) summarized the theoretical developments leading up to the period under discussion as follows:

there is a considerable body of knowledge which goes by the name of 'the theory of fishing' or 'the modern theory of fishing' ... it is concerned with predicting what catch can be obtained from a given number of young fish recruited to fishery, if their initial size and the growth and natural mortality rates prevailing are known. That is, methods have been developed for computing the effects of different rates of exploitation, of changes in rate of exploitation from year to year, of different minimum size limits, etc., upon the yield obtained. Not only that, but much progress has been made in developing methods of determining the actual magnitudes of the population statistics required to make this calculation.¹⁴

With respect to future research efforts, Ricker (1954:559) defined the approach to be undertaken in the following way:

it has become an urgent problem to have a scientific description of the regulation of abundance of fish stocks, in order to complete the basis for predicting optimum levels of exploitation.

¹³It was during this period that the concept of Maximum Sustainable Yield (MSY) was developed. The MSY concept is the level of fishing mortality that produces the greatest physical yield on a long-term basis. This yield is usually associated with a surplus production curve and as such combines the elements of recruitment, growth and mortality into one factor (Roedel, 1975).

¹⁴ This is not to say that other factors such as environmental conditions and fecundity etc. were ignored. Smith (1987) provides an excellent review of the research that took place between the First and Second World Wars by scientists trying to isolate and understand the factors that influence population fluctuations. Despite this, the majority of fishery research was essentially focused during this period on trying to determine the extent that fishing effort affects the yield from the fishery resources.

Schaefer, also saw his work as being concerned with maximizing catch levels. Discussing his understanding of the nature of the fishery resources and their exploitation by the fishing industry, Schaefer argued that:

Experience (history) having shown that the stock of commercial sizes of a sea-fish species, and the annual harvest obtainable from that stock, is related to the amount of fishing effort applied, there arises the important question of how the amount of fishing should be managed in order to provide the greatest benefits to mankind (Schaefer, 1957:670).

Following the Second World War, then, the orthodox approach was again redefined and based on the MSY concept. This approach structured the ways in which both biologists and later economists, studied the marine resources and their uses for society. For example, the biologists and economists of the 1950's and 1960's worked on the problem of identifying and quantifying the biological and economic factors that affect the population and harvest levels of fish stocks (Graham, 1956). This work concentrated on developing the means for calculating "catch equations that would maximize present and future returns from the living aquatic resources" (Emmerson, 1980:10).¹⁵

¹⁵ For biology, the most important contribution during this period was the formulation of mathematical relationships or models of fisheries being exploited. These models provided a means to estimate potential yields from fisheries under specific fishing conditions. Two different methodologies, the 'yield per recruit' method and the 'surplus production' method emerged and became the basic approaches used to calculate maximum sustainable yield levels of fish populations. The yield per recruit method (also known as the dynamic pool method) is associated with the research of Beverton and Holt (1957) while the surplus production method is associated with work of Milner Schaefer. The Beverton-Holt method analyzes the yield data (the weight or number of fish per year class) for a number of different catches made under different fishing conditions and compares this data with the average number of fish that are produced under the same conditions. The Schaefer method analyzes the total population trends of a fishery and compares this to the total catches by the fishing effort (under non-equilibrium conditions).

Beverton provided an insight into his understanding of the fishery resources and how they should be used by society when he wrote that:

During the first half of the present century the history of the development of the North Sea demersal fisheries has provided a practical demonstration of the behaviour of an unregulated fishery. The main feature is that a rough balance has been set up between the fishing activity on the one hand and the natural productivity of the stock on the other, but the level at which this steady state was maintained has on the whole been unfavourable to man, many fishing industries being forced to operate at an undesirably low economic level (Beverton, 1953:56).

According to Beverton, the fisheries were to be managed and harvested in the interests of the fishing industry. Again we see that the theories of fishery management being developed by biologists and economists continue to be heavily influenced by the economic interests of the times.

Beginning during the early 1950's Beverton and Holt worked out their theory of fishing, based on a yield per recruit or dynamic pool model, at the Lowestoft Laboratory in Britain. Building on the works of Baranov (1918), Russell (1931), Graham (1935), and Ricker (1944) the two researchers were able to develop a theoretical fishery management model that could take "the main dynamic properties of a fishery and ...[suggest]... the first steps which are required to regulate it" (Beverton, 1953:59).¹⁸

¹⁸ Beverton pointed out that their theoretical model differed from the yield equations of Baranov and Ricker in that stock recruitment is measured when fish enter the fishing area when they are being caught. As well the use of the von Bertalanffy growth function for analyzing the relationships between stock growth, food consumption, and population density differed from cubic and exponential equations that Baranov and Ricker respectively had used (Beverton, 1953:59).

An important aspect of their work was that they differentiated fishing activity into the two variables: fishing intensity and selective properties of the gear (Beverton, 1953:61). By changing either of these variables it was possible to manage a fishery at what was termed as the "eumetric" fishing level (Beverton, 1953:63).¹⁷ Beverton proposed that the eumetric level of effort by the objective for fishery management as it would obtain the best balance between the mortality (both natural and fishing) and the growth/recruitment processes of fish populations (Beverton, 1953:65).

Similarly Milner Schaefer worked out his theory of fishery management based on surplus production under non-equilibrium fishing conditions. He wrote that:

Populations of sea fish belong to a different type of natural resource, for which the annual rate of renewal of the resource is a function both of the physical environment, which is presumably constant, on the average, over the long run and of the magnitude of the standing crop, or population, of the resource, which is diminished by the rate of harvesting (Schaefer, 1957:672).

With respect to fishing the economics of the issue Schaefer pointed out that:

...the harvesting by man is simply an additional source of mortality by production, which is met by a compensating increase in the rate of population renewal, so that the population again comes into balance at some lower population level (Schaefer, 1957:673).

The key to understanding these two biological theories is that they

¹⁷ The term "eumetric" or "best steady state" or "well-balanced" fishing was a term proposed as a means for describing the range of fishing options available to regulatory authorities.

work from an orthodox perspective that uses the Maximum Sustainable Yield (MSY) concept as the basic principle. This concept fitted in perfectly at the time with the economic interests of both fishing companies and fishing nations that had been modernizing and rationalizing their fishing fleets using greatly expanded and more efficient harvesting technologies. Each theory suggested ways in which effort could be conducted while at the same time maintaining the goals of maximum harvest levels and economic returns. For example, limiting catches to set quota levels, implementing season closures and using selective gear restrictions (net mesh sizes, vessel capacity, etc.). However, beginning in the mid-1950's, and throughout the 1960's, the MSY based approach failed in controlling the expanding fishing harvests and protecting the resources. It was clear that any of the restrictive measures proposed by the biologists based on the MSY concept were either not working or not being effectively enforced (Larkin, 1977). The devastating effects of over-fishing on the commercial fisheries and the subsequent deteriorated economic positions of most fishing industry sectors left little optimism for improvement under MSY conditions (Larkin, 1977). The failure of the biological MSY approach to provide a comprehensive and effective method to manage the fisheries opened the door for neo-classical economists to argue for their own theories of fish management.¹⁸

¹⁸The fact that the biological characteristics were not the only factors affecting the well-being of fish resources had been first recognized at the turn of the 20th century. As already noted, Kyle (1905) identified economics as one of two parts of what he termed the over-fishing problem. Baranov (1918:65) saw his work as an attempt to clarify theoretically some questions of fishing economics and Graham, in 1935, concluded that moderate reductions in fishing effort would increase yields (Russell, 1942:76).

The obvious limitations of the biological management theories at the time stimulated classical economists to examine the problem of over-fishing and depletion in terms of efficiency. They began by first incorporating the fishery production theories of the biologists into their own economic theories or models. These new models were founded on neo-classical assumptions about both the nature of the fishing industry and the fishermen's behaviour harvesting the resources. This approach became known as the discipline of bio-economics. For the first time, fishery management theory now focused on both the structure of the industry and the behaviour of fishermen as the key factors for explaining over-fishing problems and the resulting socio-economic malaise in the industry.

This post-war period was the high point for using a neo-classical or "orthodox" analysis in public economic policy development throughout the world. Tom Emmerson wrote that it was a time "when free market competition was widely agreed to further efficiency and thus progress" (Emmerson, 1980:14). While fundamentally subscribing to the older classical dogma of the competitive free market acting as the invisible hand that most effectively regulates the economy, the neo-classical economists of this period recognized very early that the fishery was in fact a special case for resource economics. The original classical economists had theorized that natural resources only become valuable when they become limited and able to be appropriated. However, since this methodology had long since been discredited, the neo-classical economists reformulated their analysis to focus on the question of efficiency. An "efficient" industry would mean economic health and progress, while an "inefficient" industry would mean economic stagnation and social distress.

The neo-classical economists saw competition between fishermen for common property resources as the main cause of resource over-exploitation. This type of competition they argue had led to depletion of resources because ownership did not occur until after they were physically caught by individual fishermen. The solution proposed in overcoming this depletion tendency, was to replace individual competition with ownership or property rights over fishery resources before they were captured. This would allow for a process of industry rationalization to take place which would force the fishing industry to become more efficient by eliminating inefficient and redundant harvesting and processing capacity.

As noted, the neo-classical fishery economists incorporated the sustainable yield models of the fisheries biologists into their own analysis (Cushing, 1968, 1981, 1983; Gulland, 1977).¹⁹ By relating the potential yields of a fishery and the total costs involved in harvesting them, economists developed a new theoretical concept for fishery management called Maximum Economic Yield (MEY). This MEY approach incorporated both biological and economic perspectives and assumptions about the nature of the resource and fishing into a theoretical framework. These new theories or models were able to formulate

¹⁹ This is the same perspective which continues in much of the present day literature. This view rests on an important assumption about the character of fish populations. As Wilson (1982:430) pointed out, "the traditional view assumes that the relationship between current and future stock sizes is continuous, stable and shaped so that it yields a long-run maximum sustainable or economic yield. When one perceives the environment in this way, it is reasonable to urge management to pursue the fine tuning of the fishery, especially through controls on fishing effort in order to affect the size of current stocks". (Wilson, 1982:430). This assumption focuses attention on the production aspect, but overlooks other characteristics of fish populations, such as their tendency to fluctuate dramatically over periods of time.

a relatively simple and direct method [for] analyzing the equilibrium conditions under open-access regimes and the optimum conditions under managed regimes (Waugh, 1984:58).

Thus a flexible mathematical approach that integrated the biological characteristics of fish populations with the economic characteristics of the fishing industry had been created.

This methodology orthodox perspective proponents argued, provided the necessary tools for analyzing and solving over-fishing problems in terms of increasing economic efficiency (Clark, 1981:231-232). Neo-classical economists were convinced that solutions to the problems for managing of the fisheries were simply a matter of implementing policy mechanisms that would maximize industrial efficiency. They argued that if these types of policies were implemented then society in general would benefit because both conservation and best use of the fishery resources would be achieved.

This neo-classical or bio-economic approach began with the work of Scott Gordon in the early 1950's.²⁰ He argued that because the fisheries were open access resources, they naturally attract increasing fishing effort. Gordon (1954) felt that the theories of fishery management had yet to include the economic principles at play within the fisheries. Specifically, the problem in Gordon's view was that the biological theories had not placed the behaviour of fishermen as "an integrated

²⁰Peder Anderson (1981:1) writes about his discovery of Jans Warming's 1911 published article, which he claims dervived the same results as Gordon postulated more than 40 years later. Anderson enthusiastically notes that Warming's classical results "have withstood the test of time... and are as applicable today as when they were first written."

element of a general and systematic 'bionomic' theory" (Gordon, 1954:128).²¹

While he acknowledged that some biologists had been aware of the inter-relationship between biology and economics, Gordon was quite critical of the fact that economic analysis had not been formally included in the management theories (Gordon, 1954:124). As Waugh points out, the Gordon analysis contributed greatly to the development of the modern day bio-economic approach. He provided a simple framework for understanding the over-fishing of resources in which an economic equilibrium is achieved and where the costs used to harvest them equals the prices received from them (Waugh, 1984:31).

Gordon's idea was to replace the biological MSY concept of fishing with the new MEY concept.²² Gordon (1954) saw MEY as simply the optimum utilization of a resource defined in terms of the total revenue or value of production, minus the total harvesting costs (Gordon, 1954:129). Since the fishery resources are open-access and inevitably reach a point of economic equilibrium where the rent (or economic yield) is completely dissipated, Gordon proposed that they be made either private property or

²¹ It should be pointed out that Scott Gordon felt the application of economic principles to the fishery was appropriate because "the large numbers of fishermen permit valid behaviour generalizations of their activities along the lines of the standard economic theory of production" (Gordon, 1954:128). Using this behavioural assumption he demonstrated that over-fishing of fishery resources was rooted in the economic organization of the industry.

²² Gordon was quite critical of past restrictions used to control fishing effort. He wrote that "practically all control measures have in the past, been designed by biologists with the sole attention paid to the production side of the problem and none to the cost side. The result has been a wide open-door for the frustration of the purposes of such measures" (Gordon, 1954:132).

public property and subjected to a central controlling authority (Gordon, 1954:135).²³

The next year, the works of Anthony Scott furthered the cause for enclosing or privatizing the fishery resources. Scott (1955:117) modifying Gordon's 'open access' conception of the fishery to a 'common property' analysis and the MEY concept as the most effective theoretical approach for fishery management. He argued that the achievement of efficiency in the fishery could only occur by the complete appropriation of all resources in a particular marine area to a sole owner. This he felt was a much superior regime to competition under conditions of common property. He based his argument on the assumption, that if fishermen or companies actually own the resources, then the incentive to maximize individual profits would also inadvertently maximize the net social benefits to society. Scott stated it in the following way:

As long as the user of a fishery is sure that he will have property rights over the fishery for a series of periods in the future, he can plan the use of the fishery in such a way as to maximize the present value (future net returns discounted to the present) of his enterprise. From the social point of view it can be said that he will bring about the

²³A modern applied example of Gordon's theoretical conceptions of a fishery theory is given by Clark (1981:233) when he described the progression of events leading to the 1972 collapse of the Peruvian anchoveta fishery. First, there is a phase of expansion of fishing capacity and increases in annual catches. The need to control catches in order to prevent depletion eventually becomes apparent (possibly only after catches have already begun to decline), and institutions are established to assess the resource and to recommend catch limits and other regulations. But fishing capacity continues to expand - even though such expansion is clearly unnecessary - with the result that the fishing season must be progressively shortened to prevent over-fishing. Eventually a rather tenuous economic equilibrium may become established with income to existing vessels and fishermen so low as to inhibit further expansion ... Fisheries managed in this way are characterized by brief fishing seasons, crowded fishing grounds, poor product quality due to inadequate handling of the catch, idled vessels and processing plants for much of the year, and in some cases the ultimate demise of the fishery, possibly triggered by an environmental change.

'best' use of the fishery and of all other factors invested in it over future periods by thus allocating outputs and outlays over time in accordance with the current rate of discount. (Scott, 1955:122).

Scott was contemptuous of the biological conservation restrictions justified by the earlier MSY theory in order to control fishing effort. He drew attention to Gordon's early observations that biologists seemed to be quite ignorant about the effectiveness of their restrictive measures in actually conserving and protecting any fish populations (Scott, 1955:117). What concerned Scott was that biological fishing restrictions were imposed at an economic cost and they obstructed the trend towards the increased economic efficiency within the industry (reducing input costs through technological advances and organizational innovations).

This theme of advocating the MEY concept over the MSY concept was supported by the research of another important neo-classical economist, Crutchfield (1956), who in a paper entitled "Common Property Resources and Factor Allocation" tested the theories of Gordon and Scott in his case study of the Pacific halibut fishery. Crutchfield recognized that there were difficulties in getting the fishing industry's support for any conservation measures that go beyond the purely biological aspects. He was cautiously optimistic that increased efficiency in the halibut fishery could occur if the necessary policy restrictions (imposition of property rights) were implemented gradually so that disinvestment in capital equipment and forced occupational shifts of fishermen would be minimized over time (Crutchfield, 1956:300).

Later Crutchfield further clarified his understanding of the relationship between conservation and efficiency by writing that:

Conservation is essentially an investment decision. Is it wiser to take all the fish now or to take some now and 'invest' in the productive capacity of the fisheries stock itself? This decision is no different in concept from investment in a factory, a store, a truck, or any other type of capital investment. What is confusing in the case of a fish population or a forest is that the inventory of final products and the factory are one and the same thing; the problem is to find an optimal balance between a fishery stock viewed as a source of consumer goods and the same fishery stock viewed as a piece of productive equipment. In either usage it is essential that the largest net benefit from both investment and consumption be obtained" (Crutchfield, 1965:55).

Emmerson (1980:14) in his review of the period, shows that by the 1960's the neo-classical fisheries economists had succeeded in making the MEY concept and the exclusive ownership over now what was being termed as common property, part of the orthodox perspective approach to fishery management.

This orthodox approach was supportive of the general policy initiatives undertaken by governments and industries during this period. Governments were subsidizing their fishing industries in general and the corporate sector in particular, with the aim of modernizing them (Barrett, 1984:79). It was envisioned at the time that modern, technically advanced fleets would harvest the resources in the most efficient way, as predicted by the MEY theory. Later as management agencies failed to adequately control and regulate the increasing harvest levels (using the MSY inspired restrictions), the now heavily capitalized fishing interests became increasingly concerned about the state of what they saw as common property fisheries. They were concerned that no more effort through increased participation be put on these resources or else their economic interests could be jeopardized.

The common property argument now became the focal point in the orthodox perspective. The argument simply states that since common property resources are free to be harvested by everyone, the fishery is inescapably subject to over-fishing. Competition rather than conservation eventually becomes the major aim of those fishing the resources. Fishermen increase both their fishing effort and capital equipment in order to catch as much fish as possible as quickly as possible. Inevitably a tragedy of the commons results. This tragedy takes the form of fish stock depletion, underutilization of capital, over-supply of labour and where alternative work opportunities are scarce, low incomes (Crutchfield, 1965:44-64). It is at this point in time that acceptance of the orthodox fishery management approach with its emphasis on efficient harvesting and enclosure of the commons becomes important to the industrial interests of a fishery.

The orthodox perspective, which now has culminated in the development and use of bio-economic fishery management models, as we have seen can trace its historical roots and theoretical assumptions, back to the mid-19th century. The main assumption of the orthodox approach is that the fishery is a system that can be understood in terms of equilibrium equations. These equations are used to calculate the balance between fishery productivity and harvest levels or between value of catches and cost of harvesting. The competition between fishermen harvesting the resources is assumed to be conducted on a basis of equality. For example, because the number of fishermen in a fishery is deemed to be so large that for the purposes of analysis each fisherman is assumed to have relatively equal amounts of skill, capital equipment, and

access to resources and markets. The orthodox perspective also assumes that the fishery system is essentially autonomous so that social, cultural, and political influences have neutral or marginal impact on the harvesting, processing and marketing processes. Today, these same orthodox assumptions continue dominating and influencing the decision-making process in most fishery management systems throughout the world (Anderson, 1981, 1983, 1986; Bultin, 1975; Christy, 1977; Christy and Scott, 1965; Clark, 1977, 1985, 1986; Clark and Munro, 1980; Cruthchfield, 1970, 1975; Cushing, 1974, 1983; Dickie, 1976, 1979; Gulland and Robinson, 1973; Larkin, 1977, 1980, 1982; Larkin and Wilimovsky, 1973; Munro, 1979; Pauly and Murphy, 1982; Pearse, 1979, 1980a, 1980b; Retting, 1988; Rothschild, 1973; Scott, 1979, 1982; Turvey, 1964; Turvey and Wiseman, 1957).

6. Conclusion

This chapter has traced the historical development of the orthodox perspective theories of fishery management from their European roots in Darwinian Biology, in the last half of the 19th century, to their neo-classical economic antecedents in the 1950's and 1960's. The traditional understanding of these developments have been that the theories are the product of an objective, value-free evolution of scientific research and knowledge. This chapter challenges this traditional understanding by showing that competing theories and debates shaped by the political and economic context within which they developed, were instrumental in shaping the end product.

The orthodox theory of fishery management emerged at every stage with close ideological justifications for fairly specific economic interests. For example, in the early 19th century, theorists saw the fishery as inexhaustible, a view that legitimized the industrial transformation of the industry. If the fishery was inexhaustible then the use of new technology that significantly increased the catch limits was easily justifiable. This approach also eliminated the need for the emerging industrial sector to examine the impact of new trawler technology on the resources even though fishing communities and small fishermen were arguing for just such an examination. In the pre-WWI period there was a shift to the ecological equilibrium approach which attempted to address what was by that point in time clearly recognized as imbalances and fluctuations in the stocks. The ecological-equilibrium theory stated that every fish stock produced a surplus. The solution to fishery problems was to discover and capture the level of surplus produced by the natural stocks. This, it was argued would not only protect and support the industry, it would be beneficial to the fishery by keeping it in natural balance. Although the industry recognized that problems with the stocks existed, their ability as a result of the new trawler technology, to maintain productivity and profits through continually expanding their range of operations tended, at least to some extent, to mask the economic reality of stock depletion. Thus the powerful interests in the fishing industry did not encourage or support any proposed restrictions or fishing practices other than purely scientific efforts to understand the ecological-equilibrium of the fish stocks.

After the war fish stocks were replenished as a result of forced

fishing inactivity and it became clear that the problem was one of over-fishing. This became clearer in the context of the increased use of improved fishing technology and nations competing and claiming historical rights to particular fishing grounds. As a result, research shifted towards developing theories of fishery management that would balance the production of the resource with the commercial harvesting effort.

Post WWII ushered in a second major industrial transformation of the fishing industry. New technological innovation made it possible for the large industrial sector to increase fishing effort through the use of long distance fleets. Before long there was major fishery collapses on a world-wide basis. As a result, the ideas of the pre-war period were taken up again, especially the ideas of regulation and restrictions involved in managing a common property. The fishery problem as they saw it was with the competition between fishermen vying for common property resources. This competition, they argued, leads to resource depletion because ownership does not occur until after the fish are caught by individual fishermen. The solution proposed was to replace individual competition with ownership or property rights over the resource before the fish are captured. This would allow for a process of industry rationalization, forcing the industry to become more efficient by eliminating inefficient and redundant harvesting and processing capacity. This view, although appearing neutral, in fact favoured large over small fishing interests and industrial interests over community interests. It is these ideas, first raised by bio-economists that underlie the present day orthodox theories of fishery management.

CHAPTER THREE
Orthodoxy Challenged:
the Liberal Critique

1. Introduction

By the 1970's because of dramatic changes in the fisheries throughout the world, the orthodox perspective theories and their underlying assumptions were being challenged by new critical views. What caused this re-examination of the orthodox approach?

During the 1950's and 1960's, many fisheries were undergoing dramatic industrial transformations which reached their peak in the early 1970's. The transformations resulted in the industrial sector of most fisheries were becoming increasingly concentrated and more powerful relative to the traditional small-scale sector. The organizations responsible for managing fisheries such as International Commission of the North Atlantic Fisheries (ICNAF) had failed in their efforts to control harvest levels and protect the resources. Important fish stock collapses were occurring throughout the world on a regular basis causing economic crisis for many fishing industries and dependent fishing nations. All of these transformation factors led to a widespread recognition and consensus that fisheries must be managed effectively if stocks were to be

rebuilt and future crises avoided.¹ Since most fishery resources existed in international waters, it was perceived that only an international effort could adequately address the complexities and management problems involved.

In 1973, the Third United Nations Conference on the Law of the Sea (UNCLOS III) was convened to negotiate an international framework for agreements between nations on the future use of sea resources and management responsibilities.² The fishery was one of the first resources to be dealt with since it was already in crisis. The UNCLOS III negotiations specified that each country could declare 200 mile Extended Economic Zones (EEZs) and determine their own fishery management goals, so long as they abided by the guidelines set by UNCLOS III. Each country's goals were individualized and shaped by their particular needs. Needs were based on the economic priorities of each particular country, and ranged from being supportive of the industrial business sector as was the case in Canada, to being supportive of the local community interests and small boat fishermen interests as was the case in Norway. By the 1970's many countries began setting up legal and administrative structures to implement their management goals within the newly declared extended

¹ The International Commission of the North Atlantic Fisheries (ICNAF), one of several international organizations had been set up after WWII in order to manage and control fishing effort. Their failure resulted in many communities of coastal fishing states traditionally dependant on these resources finding themselves in economic distress and often poverty.

² The conference was convened on November 16, 1973 under the authority of the United Nations General Assembly resolution 3067 (xxxviii) and concluded in 1982. For the text of the convention see International Legal Materials 21 (November, 1982:1261.

economic zones (EEZs) adjacent to their coastlines and based on the UNCLOS III Convention.³

It was during the UNCLOS III negotiating process between 1973-82 that the social, political and cultural importance of fisheries for the welfare of local, national and international interests was formally being recognized. In addition to the economic importance traditionally emphasized for the fishery, the legal, regulatory, geographic, historical, and cultural implications of fisheries management policies began to come into focus and the complexities involved in particular management approaches began to be debated. Researchers from disciplines and fields outside of fisheries biology and neo-classical economics were consulted on issues and in turn they became interested in the study of fishery resources and their future use and management. It was this interest that stimulated the new critical research effort of the 1970's and 1980's and resulted in the creation of new fisheries social science literature (Bromley and Bishop, 1977; Anderson and Wadel, 1972; Anderson, 1978).

The new literatures brought to light facts that showed fishery management policy and practice had implications that went far beyond the biological and economic concerns of conservation, protection, and production. For example, there were implications for traditional rights of access to the resources, for future uses of the resources, for allocation of management responsibilities, for viability of fishery dependent communities, for historic fishing patterns of foreign fleets,

³ UNCLOS III enabled individual countries to assume custodial responsibilities (management and protection) over the resources in the newly declared EEZs but the Convention did not bestow actual ownership.

for increased conflict between competing industrial offshore interests and traditional small boat fishermen interests, and for the rights of other users of the seas including commercial transportation, military freedom and oil and mineral rights. The realization of these implications made clear that proper management of the fisheries involved not only consideration of the biological and economic factors but also the political, social, and cultural factors affecting all users of the seas and resources. The new research raised important questions about the management of fishery resources and attempted to broaden the orthodox perspective foundation upon which most management theory and policy was based (Anderson and Stiles, 1973; Apostle, Barrett, et al, 1985; Apostle and Barrett, 1987; Cormier, 1980; Fricke, 1985, 1973; House, 1986; Jentoft, 1988, 1985; Jentoft and Kristofferson, 1987; McCay and Acheson, 1988; Pinkerton, 1987; Stoffle, Jensen and Rasch, 1984; Thiessen and Davis, 1986a, 1986b, 1986c; Williams, 1985).

Townsend (1985), an United Nations Food and Agriculture Organization (FAO) consultant, argued that the biggest problem with present day fishery management theory is that it continues to be dominated by neo-classical economists and biologists. He writes that traditionally trained biologists and economists are generally not suited for the task of analyzing the complexities of the fisheries. He notes that not only are the social, cultural, and political factors unfamiliar to them, but that these factors cannot be understood within the scientific (bio-economic) methodology of the mathematical models they use. He suggests that what really is required are the research skills and professional judgments of political scientists, cultural anthropologists, and sociologists. These

skills and judgements are necessary to address the social needs of the fishery and that "economists and biologists must yield part of their virtual monopoly in fishery research to other social scientists" (Townsend, 1985:2052).

A review of the 'state of the art' orthodox theories of fishery management' was an obvious point of departure for the new research efforts. It was generally agreed that traditional neo-classical approaches were inadequate, that the assumptions underlying them were incomplete, and that the theories themselves only advocated certain narrowly defined policy directions, and excluded equally viable alternatives. For the first time explanations began to emerge which attempted to explain the often spirited responses of fishery participant groups and individuals who had been most affected when orthodox based policies were imposed. This chapter reviews the new literature criticizing the neo-classical approach, examines some of the key issues the criticisms raised, and shows how despite the criticisms the neo-classical approach continues to prevail and dominate as the most legitimate perspective for addressing fishery management problems.

2. Welfare Economics

As we have seen, it was the economists working in the neo-classical tradition who began in the early 1950's incorporating existing (and failed) biological models of the fishery into their own analysis and link the biological problem of resource conservation with the neo-classical concern for economic efficiency. After the 1970s a number of economists

working in the area of welfare economics began having serious difficulties with the bio-economic analysis approach (Bishop, 1977; Bromely, 1977; Copes, 1972; Bishop, Bromely and Langdon, 1981; Wilson, 1982, 1986a, 1986b; Wilson and Acheson, 1980; O'Neill, 1984). For instance, the orthodox definition and application of the efficiency concept; the bio-economic conceptualization of the capture and distribution of net benefits from the resource; and the traditional assumptions underlying the way that marketing processes were all seen to be inadequate or wrong given their own research findings.

Bromley and Bishop (1977) observed that although the efficiency focus has formed the cornerstone of the orthodox approach for addressing bio-economic issues, its application for solving equitable distribution issues was inadequate. Bishop and Bromley found in their review of five bio-economic case studies that an unequal relationship existed between the efficiency issues and the equity issues. For example, while bio-economics has focused solely on inefficiency in the industry (too much labour and capital for the potential returns), issues of equity have been degraded as unimportant or assumed away. Little or no solid research had ever been presented on the distributional implications of particular management policies promoted as solving problems in each of the studies they reviewed.⁴ They note that this is a typical feature of the orthodox fisheries literature in general and write that:

since there are a definite number of efficient solutions all based upon a different distribution of rights and endowments,

⁴ The aim is efficient productive conditions in the market which creates the largest feasible wealth for society. The problem with the theory is that any competitive advantage in the market also creates a distributive benefit.

to talk of efficiency in public policy issues is totally without normative meaning; efficiency is without meaning in isolation from reference to distribution" (Bromley and Bishop, 1977:287).

Bromley and Bishop are not against the use of the concept of efficiency in fisheries, but they are against the way that orthodox theorists ignore other possibilities and alternatives. They felt that the question of distribution is deliberately ignored in orthodox literature. They argued that even if orthodox economists agreed on the need for including an analysis to provide for a more equitable distribution of fishery benefits, other questions concerning the effects of some policies and as limiting entry to a fishery arise. For example, the fishermen who are permitted to fish would also be those who generally have the greatest potential to be employed outside of the fishery, while those who are excluded would be those who are the most dependent on the fishery for their welfare. Policies such as limiting entry they discovered actually encourage greater social inequity between fishery participants. Bromley and Bishop lament the fact that the fishery management literature has to date very little information offer no direction to addressing the distributional implications of their analysis (Bromley and Bishop, 1977:295). They point out that other fishery conditions including the existing distribution of income, power, and natural rights, influence the demand and supply equations of orthodox perspective theories, which provides only one efficient solution to any particular problem. Change any one of these other conditions and the particular efficient solution also changes. Bromley and Bishop conclude that:

...if economists are to have something to say of relevance in the design of practical fisheries management policies, we are going to be forced to move beyond the conventional fascination with economic efficiency as traditionally defined in the literature (Bromley and Bishop, 1977:296).

Wilson (1982) and Emmerson (1980), further the critique of the orthodox approach for ignoring the distributive implications of their work. They felt that compared to the issues of production and conservation, the distribution issue had received inadequate theoretical attention. Emmerson (1980, p. 111) noted that orthodox theory's concern with trying to obtain the maximum sustainable yield or maximum economic yield from a fishery had important distribution implications for those communities who are totally dependent on them for subsistence. He points out that by ignoring distributional aspects, the orthodox approach fails to be sensitive to ways that different communities and societies use fishery resources by adapting themselves to the seasonal/yearly fluctuations of resource availability. The point of Emmerson's argument was to caution against unilaterally imposing policies that force vertical integration of fish industries. For example, implementing policies that improve catch technology, expand shore facilities, reorganize markets, without at the same time, also considering the alternative benefits of 'horizontal' integration that enables low-income participants to also benefit from opportunities for continued participation and employment. He felt a fishery management change from an orthodox approach, to an approach that combined more sensitivity to marine resources and maritime communities could form a better basis for policy making, especially in developing fisheries.

James Wilson (1982) noted that since orthodox bio-economic theory usually presents the fishery as a stable single species system it greatly oversimplifies the understanding of the problems of the fishery. He put forward three fundamental issues faced by policy makers when they try to implement orthodox based management theory.

First, the imperfections of our knowledge and the uncontrollable variations on fisheries systems severely constrain the range of economically feasible management options. Second, the social cost of rule making and enforcement (for example, collective transactions costs) are high when a complex, uncertain and highly variable environment is the target of management. And third, efficiency in this kind of environment is much more closely related to adaptive, learning behaviour of individual economic factors than to the traditional notion of input cost minimization (Wilson, 1982:417).

These three issues, Wilson feels, fundamentally undermine orthodox perspective theories. He argues that fishery problems have to be placed within an environmental, economic, and social context and the elements of this context are not necessarily continuous or stable. Some of these elements he refers to include human interactions (exchanges) which are continually having undertaken over-fishing which is a collective problem, and management solutions that unless they are specifically "tailored to the particular context of the problem" may exceed the social costs of their implementation (Wilson, 1982:433).

Orthodox based fishery theory was criticized for ignoring the involvement of existing political institutions in the harvesting, processing, and marketing of fishery resources. Any influence that these institutions exert is generally assumed away by orthodox theory proponents unless it is so dramatic that it demands consideration. The usual

orthodox response to this criticism is to provide an ad hoc explanation of the disturbing force (Evensky, 1987:178). Evensky feels that the problem with orthodox methodology in general is that the bio-economic models are built on a presumption that social and political structures have no effect on the fisheries. Therefore in this way the orthodox based approach does not need to provide a systematic accounting for the non-neutrality of social and political influences on the fisheries.⁵ As a result orthodox theorists simply provide ad hoc explanations or qualifications for results that differ from the predictions of their bio-economic equations. This lack of explanation however has undermined both the credibility and relevance of much of the work using an orthodox approach when it is applied to the problems of the real world (Evensky, 1987:183).

One of the first critiques of the orthodox approach on this basis was made by Bromley and Bishop (1977).⁶ They pointed out that the orthodox approach relies on only a few concepts. These concepts generally are applicable to the firm level of analysis (optimization of profits) and do not apply the level of considering how political factors affect the

⁵ An important economic advantage that one can have in any economic competitive process is determined by the amount of influence and control of the social and political structure exerted. Social and political institution control enables one to access a tremendous number of opportunities and overcome many obstacles not available to competitors (Evensky, 1987:185).

⁶ Bromley and Bishop also object to a theoretical approach that has not only distorted the direction of economic research, but also the advice that economists give to fishery policy makers. They argue that the orthodox fisheries legacy has been one of a virtual domination of the issues dealing with the management of these resources.

fishery management process. For example they write that:

... in all the relentless searching for instances of "market failure" and "externalities" (crowding, mesh, and stock externalities) we have ignored the pervasive "externalities" emanating from the political arena. For when public choices are made on a basis of less than unanimous consent of all participants -and all public choices are thus characterized - production runctions and cost functions are directly influenced by other decision-making units. What better way to influence the production function of a fishing firm than to restrict its access to the fishery (Bromley and Bishop, 1977:296).

Welfare economists argue that the benefits and costs of fishery management must be seen as more than a profit maximization proposition. They feel that other benefits, and costs must be included in any analysis of the fisheries. They emphasize that the fishery is not only a competitive industrial process but also an industry upon which communities and fishermen are dependent. Although the welfare economists are not against the general market principles of economics, they do try to expand and integrate the strictly economic interests of industry owners (harvesters and processors operating for profit) with the social and cultural interests of dependent fishermen and their communities. They point out that other participants such as fishermen organizations, politicians, government managers, community leaders, all have interests in fisheries and these participants both influence and play important roles in the processes for managing them.⁷ In addition other agencies and groups including foreign governments and competing industries,

⁷ Bromley and Bishop note "that it has taken more than two decades for (neo-classical) economists to realize that the fishermen, themselves, might have something to say about the rules which define their opportunity for economic welfare (Bromley and Bishop, 1977:298).

markets, and financial conditions can effect the state of any fishery. All of these other social factors can be seen to be exerting different and often contradictory influences on the fishery management problem. The contribution of welfare economists to the fishery management literature is to expand the orthodox methodology from a sole focus on efficiency issues to an expanded form that incorporates other relevant factors such as the distribution of benefits and costs. This welfare economic critique of the orthodox approach however it must be kept in mind comes from within the economic discipline itself. The aim of the welfare economists contribution is to modify and revise but not fundamentally transform the general orthodox approach. For that reason, welfare economists themselves also, overlook other important analytical factors and conditions that affect the management of the fishery resources. Some of these other factors include: the inclusion of the perspective of fishermen themselves, the internal organization of fishing communities and the contradictory nature of interests between companies and fishermen.

3. Maritime Anthropology

The anthropological analysis of the fishery generally focuses on how fishermen and their communities depend on and adapt to both the availability of resources and their environment. Since the fishery resource itself is variable (dramatic population fluctuations and seasonal migration patterns), anthropologists emphasize strategies that communities and fishermen use in order to ensure both their own survival and long-term economic stability of their communities. Anthropologists provide a

social, cultural and economic context for understanding the fisheries and the implications that particular management policies have on dependent fishermen and communities. In particular, they examine questions that focus on how policies operate and change communities, how policies are perceived and responded to by those most affected, and how policies differentially affect the various interest groups that depend on a fishery.

The anthropological fisheries literature appearing in the early 1970's was aimed at challenging certain basic assumptions that the orthodox approach promoted the common property nature of fisheries, the behaviour of fishermen exploiting the resources, and the role that social institutions and communities play in a fishery.

One of the most important concerns that anthropologists take issue with orthodox approach proponents is the characterization of fishery resources as common property that is free and readily accessible to everyone (McCay and Acheson, 1988; Apostle, Kasdan and Hanson, 1983; Breton, 1987; Dewar, 1983; House, 1986; Kearney, 1983; Lamson and Hanson, 1984; Mathews and Phyne, 1988; Pinkerton, 1988; Poggie and Gersuny, 1974, 1984). Anthropologists emphasize that fishery resources are variable, seasonal and unpredictable, and that fishermen and their communities confront this reality on a daily basis and have adapted themselves accordingly. They analyze the way that fishermen and their communities have historically developed and employed particular fishing strategies and lifestyles which are tailored to the vagaries of the resources (Gunda, 1984). They stress that dependent fishing communities and fishermen are concerned with more than the harvest levels but also with the long term

husbandry of the resources. To counter the orthodox notion that unmanaged fishery resources are common property which are inevitably destroyed by uncontrolled harvesting methods, anthropologists argue that in reality fishermen have traditionally controlled fishing levels, used non-destructive technology and developed harvesting methods that are appropriate to the availability of resources. Using community case studies, anthropologists show how maritime cultures often treat resources as community based property and have social mechanisms that provide community self-management of them (Acheson, 1972, 1975, 1981; Acheson, Poggie, Pollnac, and Wilson, 1980; Anderson and Stiles, 1973; Anderson, 1979; Davis and Kasdan, 1984; McCay, 1980, 1981, 1986; McCay and Acheson, 1988).

Acheson, Poggie and Pollnac (1980:818) argue that because the use of the common property concept is such an important intellectual foundation for the orthodox approach, the range of management alternatives for fishermen have been blocked or not adequately considered. The prevalent use of the common property concept focusing solely on the negative biological and economic effects of non-management, has resulted in policies designed to only control fishing effort (limiting entry schemes) and increase economic efficiency (use of technology over labour). These policies overlook the fact that as people are excluded from the fishery and forced to leave their communities, other economic and social

costs to society are incurred.⁸

Since the orthodox approach sees the fishery management problem in terms of the need to control exploitation rates, policies are always directed towards reducing existing fishing effort. Anthropologists such as Acheson (1980:xi-xii), Acheson and Acheson (1980:824), McCay and Acheson (1988:1), all point out that orthodox methods for measuring fishing effort (based on statistical records and mathematical equations) are deficient and do not provide a proper or accurate assessment of fishing effort. They note that fishing effort differs depending on which fishery is being exploited. They also note that fishing effectiveness (differences in success rates) is never considered or accounted for in the orthodox analysis. Moreover, they argue that anthropological studies have demonstrated that a number of social, cultural, and psychological factors influence the amount of fishing effort placed on the resource at any given time. Thus, fishing effort depends, not only on the amount of time spent fishing and the size and power of vessels as orthodox researchers assume, but also on the effectiveness of the vessels and men involved in fishing operations. Acheson and Acheson (1980:839) argue that in the short run, fishing effort is determined by the skills, information networks, and crew composition of fishermen and vessels, while in the long-run fishing effort is controlled and limited by the number of fishermen with the necessary commitment, experience, and resources to enter the fisheries.

⁸ M. Estellie Smith notes in her criticism of orthodox based policies that many of the problems in the fisheries are simply a result of the creation and encouragement in the growth of large industrialized fishing fleets (Smith, 1977:8).

The orthodox assumption that inevitable and destructive competition between fishermen always leads to over-exploitation of fishery resources, is also challenged by anthropologists. Anthropologists, by studying community based fisheries and the behaviour of fishermen harvesting them resources write that fishermen are capable and willing to conserve the resources upon which they depend. John J. Van West argues that fishermen have intensified the harvest in fisheries not because of profit maximization but because of a need to maintain their income at levels which would enable them to survive the adverse market conditions created by dominating processor groups. His research on Port Dover fishermen showed that fishing intensity increased as a direct result of low dockside prices, processor imposed fishing quotas, or a combination of both, which was negatively affecting fishermen incomes (Van West, 1986:43). In other words, the source of fishing intensity originated not in competition with the harvesting efforts of independent fishermen, but with competition from processor-owned vessels, and processor-controlled market conditions. Such studies show that the orthodox conception of the destructive competitive behaviour of fishermen on the fishery resources is at best incomplete and at worst misleading when used in trying to understand problems associated with stock depletion and resulting economic distress.

Another concern with the orthodox approach, raised by anthropologists, is with the portrayal of fishermen indiscriminately exploiting the resources for individual gain. The orthodox perspective sees fishermen participation in the fishery solely as an economic activity, where they are described as competitive and predatory individuals who work alone trying to catch as much fish as quickly as

possible. Anthropologists have tried to correct this picture by offering alternative viewpoints. In countering the orthodox perspective, anthropologists expose the lack of distinction made between traditionally defined economic activities and non-economic activities (the non-competitive dimensions of fishermen lives). These other dimensions show that fishermen in their community settings often do not differentiate between work and leisure in the same way that land-based workers do. A pattern of work as a lifestyle usually characterizes individuals engaged in fishing (Poggie and Gersuny, 1974; Yngvesson, 1976).⁹ As a result, the orthodox assumption that fishermen live and operate as individualistic competitors is discounted by anthropologists who argue that this is not a real representation of them. For example, Poggie et al. research show that fishermen are quite capable of cooperative behaviour. In their discussion on the ideology of fishing Poggie writes,

...of the readiness with which seemingly individualistic fishermen seize upon the idea that cooperation in some domains is more effective than solitary effort. But in order to adapt to their physical and social environment, autonomous fishermen are clearly able to perceive the benefit of cooperation as a way to retain their individuality against the constraints of these environments (Poggie and Gersuny, 1974:104).

Also, many anthropologists [Acheson (1981), Anderson (1979), and later Townsend (1985)] found that fishermen fish for reasons beyond those of

⁹ For example, Poggie and Gersuny point out the personality characteristics of fishermen, when compared to local land-based workers tends to be less passive and routinized. They attribute these different characteristics to many factors including the physical environment of the sea, the social environment, the types of technology used, ideology, and the hunting skills fishermen need to overcome a hostile environment and migratory resource (Poggie and Gersuny, 1974:100-106).

just earning a living. They argue that fishermen receive in addition to a monetary return for their efforts, an important non-monetary benefit such as worker satisfaction. As Townsend puts it "work as a fisherman is not just another job; work for a fisherman is a fundamental part of his way of life" (Townsend, 1985:2051).

All of those researchers (Acheson, Poggie, Pollnac, and Wilson, 1980:811) are convinced that other factors are more important in the occupational decisions of fishermen than the strictly economic factors emphasized by orthodox theorists. Using his research in fishing communities in the northeastern United States, Acheson found that there are many different reasons that fishermen use to remain in the fishing industry and these reasons differ substantially from one area to another. He concluded that income and alternative economic opportunities can only explain part of these reasons.

The orthodox approach does not acknowledge the role that social institutions and communities play in facilitating the exploitation, processing, and marketing of fishery resources. By ignoring information networks, peer reference groups, and informal rules of behaviour between fishermen, the orthodox perspective overlooks factors which are essential for community based fishing to be undertaken in the first place.¹⁰

¹⁰ Acheson and Acheson make a very interesting observation about the phenomena of particular interest groups attempting to maintain control over information and expertise. They found that the conflict over fishery management issues that is so prevalent between fishermen and professional managers (usually orthodox policy makers) is not in reality about differences in problems understanding but rather in protecting their own interests. For example, Acheson and Acheson note that "if biologists and lobstermen differ on management issues, it is because their interests differ, not because of different or superior views of the world" (Acheson and Acheson, 1980:828).

Therefore, a major concern for anthropologists has been the way that the orthodox approach underestimates or ignores the role that social institutions and communities play in the fisheries. Acheson feels that because the orthodox approach lacks basic information on the uniqueness of different communities, it cannot account for the impact that policies developed from an orthodox perspective have on these communities. He writes that:

...the biologists, managers (neo-classical economists), and industry representatives often have a good deal of information on the biology of the species in question, and good economic data on catches, incomes, and so on. They (however) have no systematic information on the social organization of fishing communities or the values of people who live in them. In short, they have very little information on the differences among the communities they are trying to regulate, the basic socio-cultural factors which so strongly influence the impact of fisheries management plans, and the reactions of fishermen to those plans (Acheson, 1980:xii).

Anthropologists (Vanderpool, 1985; Lamson, 1984; McCay, 1981; McCay and Acheson, 1988; Davis and Kasdan, 1984) have studied particular fisheries extensively and determined that in order to fully appreciate the impact of management policies it is necessary to understand fishermen organizations and the differences between fishing communities.

The anthropological fisheries literature largely consists of case studies that focus on fishing communities or fishermen organizations located where fishing or fish processing is an important industry (McCay, 1985; Kearney, 1981, 1983, 1986; Lamson, 1984; Sider, 1980). Acheson (1981) in his review of the literature feels that the social ties fishermen have with their kinsmen, neighbours, business associates and friends have been studied and their importance recognized. However, he

argues that the social relationships of fishermen fishing the same species with the same technology has not been adequately addressed. He feels that with a deeper understanding of these relationships, one can gain an understanding of how fishermen cope with the social, economic and biological realities of their lives.¹¹ He categorizes these types of relationships or ties as being either clustered or institutional. Clusters are networks formed between fishermen fishing the same species, in the same area, with the same gear, during the same time period. Institutions are bilateral agreements (formal or informal) which structure the relationship between these fishermen. Acheson (1980:806-812) argues that there are two major reasons for the formation of these relationships by fishermen. First, relationships are formed by fishermen in order to overcome the uncertainty that is inherent in the fisheries. For example, availability of fish (as a result of natural stock fluctuations and seasonal migrations), gear conflicts, marketing conditions and commitments, and sharing arrangements (of risks, costs, and benefits). Second, these relationships serve as the means through which necessary information and knowledge for successful fishing operations is shared between fishermen.

¹¹ Anthropologists are particularly concerned with the orthodox assumption that misleads people into thinking fishermen cannot or will not organize to conserve resources on which their livelihood depend. For example, Acheson (1980) notes that fishermen using the same resources do not all know each other and their vessels are not capable of fishing the resources equally. Some fishermen live in close proximity of each other while others live in remote isolated areas and the range of most vessels is not equal to the range of many of the resources. Therefore he concludes that it is unfair for orthodox theorists to just assume that fishermen compete with each other, with no interest in organizing for conservation purposes, without also considering the barriers that inhibit organizing efforts.

According to anthropologists like Acheson, Poggie, Pollnac, et al, it is the orthodox assumptions of a homogenous fishing industry and competitive individual fishermen, that cause many of the problems associated with much of the orthodox perspective fisheries management policies. They, for example, conclude that since the fisheries are very diverse in terms of social organizations and communities, the only acceptable solutions to management problems will be solutions that are both diverse and sensitive to the social institutional and community contexts in which they are applied (Acheson, 1980:818). They note that the many of the present day problems of the fisheries stem from policies that are rooted in the inadequate theories of orthodoxy. For example they write that:

...many of the problems currently facing managers of the marine resources of the United States and elsewhere stem from theoretical inadequacies. Since orthodox researchers such as Hardin (1968), Crutchfield (1964), Scott (1955), and Gordon (1954) are not concerned with social systems, and we believe that the weakness in the body of theory they have developed stem from some of their presuppositions concerning the motivations and social organizations of fishermen (Acheson et al, 1980:82-821).

All of these anthropological concerns over the orthodox perspective assumptions about the nature of common property, fishermen individualism, and institutional neutrality help provide a framework for explaining the negative reaction that many fishermen and communities have when oversimplistic, and generalized orthodox perspective policy solutions are imposed. Many anthropologists by means of their challenge to the orthodox approach have concluded that this perspective appears to be focused towards rationalizing and justifying the existing economic power structure

and dominance of the fisheries by the industrial sector (McCay and Acheson, 1988:23-24). For example, policies based on the orthodox approach tend to support developments that encourage vertically integrated control over the harvesting, production and marketing processes by a few companies without considering the social, economic, and cultural implications and costs to communities that arise from such developments.¹²

Nevertheless, there are a number of important points overlooked by the maritime anthropology critique, which centre on the 'benign nature of capitalism.' Some of these overlooked points include: the internal diversity of the fishery such as the class differentiation between fishermen (for example, independent fishermen as petty capitalists using industrial technology); the dynamics of capital (profit imperative) versus industrial technology (technological imperative); and the role of the state versus capital. Despite the significant critiques made by the welfare economists and the maritime anthropologists, the orthodox based theories of fishery management continue to reign supreme. In response to their critiques orthodox theorists have re-emphasized the concept of common property, modified their methodologies and continue to ignore much of the work done outside their own perspective.

¹² However, in spite of the vigour in which orthodox theorists have advocated their policies, Acheson takes some satisfaction in the fact that at the time of the implementation of the United States EEZ, the Congress clearly recognized that management of the fisheries affected not only availability of fish resources and the viability of the fishing industry, but also the culture and welfare of coastal communities. As a result they enshrined in the Fisheries Conservation Management Act (FCMA) 1976 a general management goal (Optimum Yield) rather than the more orthodox goal of MSY (Acheson, 1980:iii).

4. Conclusion

This chapter has shown the shortcomings exposed by the liberal critique of orthodox theory. Nonetheless, orthodox theory has succeeded by expanding and modifying their own paradigm and by ignoring other paradigms in maintaining their dominance in the fishery management literature. It is orthodox theory, albeit a somewhat revised version, that still provides the main guide to defining, understanding and solving fishery management problems. Orthodox theory's present form argues that the fisheries are a common property resource, it's problems are rooted in the tendency of participants to maximize their own individual gain without concern for the continued biological and economic viability of the resource. The modern day solution the theory proposes, is to change the common property aspect by instituting property or ownership rights over the resources thereby restricting public access.¹³ This solution, orthodox theory argues, offers two benefits for society. First, the resource will be conserved since participants will be less inclined to ruin their own property. Second, the harvesting and production operations will become modernized through the application of maximizing efficiency criteria to the industrial processes. This solution purports to establish the most beneficial (i.e. profitable) conditions for those involved.¹⁴ This modern

¹³ It is argued that by restricting access to the resources the tendency towards excessive numbers of fishermen with low incomes and excessive over-investment of capital in harvesting equipment and infrastructure will be curbed.

¹⁴ Benefits for society are perceived to be distributed between individualistic or atomistic competitors. Each individual has a certain potential for success and in a free society should have an opportunity to achieve their potential and be successful. Therefore the best means for distributing

version of orthodoxy underlies most approaches used throughout the world to manage fishery resources. The question is, how does this version of the theory translate into policy and practice? The next two Chapters examine attempts to do this in both Canada and the United States.

the benefits to society are to create the necessary conditions so that competing members of society can maximize their individual gains.

CHAPTER FOUR
Paradigm, Policy, and Practice:
The State and Fishery Management Structures
in Canada and the United States

1. Introduction

In this chapter I argue that the single most important evidence of revisions to the orthodox fishery paradigm appeared in the mid-1970's and early 1980's with the emergence of fishery management policies tempered by the welfare economic critique of bio-economics. This was true in both Canada and the United States. Orthodox based policy objectives remained illusive with the intervention of historical, cultural, social, and political practicalities: the complexities of which are nowhere more apparent than in the contrasting fishery management structures that evolved in Canada and the United States. Each structure has largely failed at managing the fishery but for different reasons. I argue that, in the case of Canada, this was a consequence of state imposed policies that instead of protecting fishery resources and creating industrial stability, have inadvertently increased problems of over-fishing, industry instability and dependence on state support programs.¹ In the

¹ The period between the early 1970s and early 1980s saw the Canada lead the world in imposing fishery management mechanisms that attempted to create the economic conditions called for by orthodox theory proponents to ensure short and long term industrial viability.

case of the United States this was a result of administrative anarchy caused by a management structure where the authority and responsibility for fisheries are claimed and shared by industry participants as well as non-participants (federal/state politicians, recreational representative and the general public).

2. From Paradigm to Policy

Modern day fishery management policies in both Canada and United States are based on a modified orthodox paradigm and can be traced back to the joint participation of both countries on the International Commission for the Northwest Atlantic Fisheries (ICNAF).² ICNAF was established in 1949 as a forum for member states to meet and mutually resolve the difficult and complex fisheries management issues in the

² The history of international cooperation between Canada and United States in managing common fishery resources and developing shared objectives is a long one. For example, the halibut stocks on the west coast have been jointly managed by Canada and United States since the 1920's under the provisions of the International Halibut Commission. In spite of some early management successes achieved through the Commission, by the mid-1960's halibut over-fishing was once again occurring on a large-scale. In 1974, Canada's halibut catch had decreased to a level that was 20% of the previous decade. However, Canada and the United States experiences within ICNAF have been the most important in shaping and structuring their present day management systems. This was because the crises that occurred in the groundfish fisheries of the North Atlantic during the early 1970's helped precipitate the extended fisheries jurisdiction initiatives of each country.

Convention Area. At its height ICNAF had 10 member countries.³ Canada and United States were charter members and played influential roles in ICNAF deliberations up to its dissolution in 1978. The participation of both countries was rooted in a mutual concern with the increasing fishing effort of foreign fleets off their coasts. The activities of these fleets were having dramatic negative effects on their domestic fishing industries as available resources became depleted.

ICNAF's original task was to coordinate scientific fisheries studies for those stocks being exploited by more than one country in the North Atlantic. And the first rather tentative management objective of ICNAF was to establish the principle that fishing effort had to be controlled on the basis of rational scientific stock production information. As the effects of over-fishing became more and more apparent, this objective expanded to involve the development and imposition of fish harvesting restrictions. During the early 1960's restrictions agreed upon in ICNAF included closed seasons and areas and mesh sizes on fishing gear. Later as over-fishing increased, restrictions began including limits on the total allowable catches and individual country allocations. During the 1970's enormous amounts of time and effort was devoted by ICNAF on just determining the annual allocation or share of the resources for each country. Because ICNAF was unable to adequately enforce any of the restrictions being applied to the North Atlantic fisheries, it was unable

³ Original signatory countries of ICNAF included Canada, Newfoundland, United States, Britain, France, Denmark, Ireland, Spain, Portugal, Norway and Italy. During the 1970's other member countries included USSR, Poland, Rumania, Bulgaria, Federal Republic of Germany, German Democratic Republic, Iceland, Japan and Cuba.

to control over-fishing. This, in turn, eroded the Commission's credibility as an effective fisheries management regime and by the mid-1970's its relevance had significantly declined.⁴

The decline of ICNAF lead to a rise in interest for the international UNCLOS III negotiations that were being conducted at the time. For those nations concerned with protecting, conserving and using fishery resources UNCLOS III offered the possibility for individual state management over the resources.⁵ As we saw in Chapter Two, these negotiations, and the subsequent declarations of 200 mile fishing management zones by a number of countries, resulted in new fishery management structures and policies emerging. Canada and United States each began a process of designing and developing their own particular fishery management policies. These new policies were founded on the maximum economic yield concept (MEY) developed by the bio-economists of the 1950s and 1960s (see Chapter 2), as the most appropriate prescription

⁴ After 1977, the United States withdrew from participation in ICNAF and has not chosen to become a member of the Northwest Atlantic Fishery Organization (NAFO) which replaced it. Canada, on the other hand, has continued its participation in an effort to maintain a management organization for the important resources that exist beyond or overlap its 200 mile fisheries jurisdiction limit.

⁵ An interesting example of how conflicts over issues shape and influence public policy decisions (conflicts that orthodoxy largely ignores or oversimplifies) is Iceland's role in attaining legitimacy internationally for its extended fisheries jurisdiction claim. Four times in 1952, 1958, 1972 and 1975 Iceland succeeded in extending its fisheries jurisdiction, despite serious diplomatic, trade and military confrontations, including ramming Iceland coastal patrol vessels against British warships, and losing a decision in the International Court of Justice. However, these confrontations and the multilateral developments occurring within the UNCLOS III negotiations resulted in unilateral extensions eventually being accepted by most international fishing nations.

for future fishery management prescriptions. By 1974, with yet another major crisis occurring throughout the fishing industry in Canada, the Maximum Sustainable Yield (MSY) objective had finally lost legitimacy with most fishery management officials. Once settling on their new objectives, Canada and United States set about creating management structures and processes that would achieve them. Therefore, in 1976, the federal state refined Canada's main national objective for fisheries management to be "best use" or "optimum utilization" of the resources. The new objective in the future for Canada's commercial fisheries would

no longer be maximization of the crop sustainable over time (MSY) but the best use of society's resources. "Best use" is defined by the sum of net social benefits (personal income, occupational opportunity, consumer satisfaction, and so on) derived from the fisheries and the industries linked to them. While private enterprise, individual, cooperative and corporate would continue to predominate in the commercial fisheries, fundamental decisions about resource management and about industry and trade development would be reached jointly by industry and government (Environment Canada, 1976:53).

The objective of "best use" was aimed at maximizing economic yield as the orthodox paradigm prescribed but also acknowledged a number of social factors raised by welfare economists in their critique of orthodox theory. The state felt strongly that their active role in the fishery was necessary in order to stabilize the industry when resource or market conditions threatened its long-term viability. Although the orthodox 'efficiency' criteria of theory contradicted any role for the state to provide support funds to bail out the larger industrial sectors of the fishery, the necessary funds have always been provided in Canada.

For example in Canada by the early 1970s the Atlantic groundfish fishing industry was on the verge of collapse, necessitating the creation

of a short-term government assistance program which provided funds worth over 140 million dollars. These funds were distributed in the form of deficiency payments to the fishing industry as a means to keep the core sectors viable (for example the larger companies with offshore vessels). During the years 1974-78 deficiency payments to the harvesting sector amounted to over 60 million, with over 43 million going to the processing sector. Through a rehabilitation program another 10 million was provided to the larger companies for inventory financing, vessel dislocation adjustments and incentives to fish in non-traditional areas (Atlantic Fisheries Review, 1981).

Fishery management policies in Canada have also reflected the State's continuing attempt to deal with regional disparities by promoting economic development of its natural resources.⁸ Since WW II Keynesian policies in Canada have attempted to balance economic inter-regional disparities between provinces and sub-regions (OECD, 1980: 136-141). This has resulted in the fishery resources, which are generally located on the poor regions of the country, being managed within the framework of its national regional development policy agenda. Since orthodox theory now argues that the fisheries are a common property and their optimum utilization and protection is best provided through the process of modernization (by increasing industrial efficiency), the uncritical acceptance of orthodox fisheries assumptions by federal policy makers is easy to understand. That is orthodox fishing theory compliments the wider regional development objectives that sees regional problems in terms of

⁸See Stewart Bates, 1944, 1952; Harold A. Innis, 1978 (reprint); Ronald Tallman, 1977; Watt, 1963.

backwardness and underdevelopment. Therefore, improving the fishing industry by encouraging modernization of its industrial sector, is consistent with the Canadian federal government's regional development objectives, as well as providing the means for the fisheries to be managed and protected in the most optimum way (Government of Canada Documents, 1928-1988).

The United States implemented its approach to fisheries management with the enactment of the Fishery Conservation and Management Act, 1976 (FMCA, 1976) now called the Magnuson Act. The overall objective of United States fisheries management approach was similar to Canada's as it drew on the same paradigmatic foundations in bio-economics tempered by welfare economics. As stated in the FMCA, 1976 the management objective specifies that any fishing effort placed on the resources must be conducted at an "optimum yield" level. The optimum yield of a fishery is determined as the level of catch which "provides the greatest overall benefit to the nation". This level was based on the maximum sustainable yield from each fishery, modified by relevant economic, social or ecological factors (Hennessey and LeBlanc, 1982:15; Vanderzwagg, 1982:102). The optimum yield objective however, was to be established not by the state, as was the case in Canada, but through public participation. The optimum yield objective was similar to Canada's "best use" objective in that both were derivatives of a modified bio-economic approach. Each country's fishery management objective included some acknowledgement of the social dimensions of the fishery. They both, however, continued to fixate on the orthodox 'efficiency' issue that maximizing criteria remain the ultimate concern in policy formulation. The major modification was therefore, a

rhetorical one. While each country acknowledged other dimensions of the fishery such as the social and ecological needs, neither actually accounted for them in meaningful and practical ways because they took second place to traditional neo-classical concerns.

3. From Policy to Practicality

The 1976-81 period saw fishery management policy in Canada and the United States being operationalized on the basis of their experiences in ICNAF and the political conditions at the time. The objectives were essentially identical but as each country attempted to concretize them, divergent management policies and structures began to emerge. These reflected each country's different historical, political, economic and cultural conditions. Nowhere was this more clear, paradoxically, than in attitudes toward the role of the state itself.

A. Centralization and Adhocery: The Canadian Fishery Management System

The most prominent feature of the Canadian approach to managing the fisheries over the years has been its centralized federal authority (Government of Canada documents 1928-1988; Fairley, 1980; Forrest, 1981). This feature reflects the historical importance that the fishing industry has traditionally had to the economies of the seacoast provinces. In fact, concerns over the exploitation rights of the fisheries played such an important role in the British North American colonies that they were

a key factor in the formation of the Canadian Confederation.⁷ The British North America Act, 1867, which bound the fishing provinces of Nova Scotia and New Brunswick together with Upper and Lower Canada, was drafted to ensure that the authority for protecting the fisheries was given to the new federal state. As Tallman (1975) explains, the consensus reached at the time of Confederation placed fisheries matters under federal jurisdiction and allowed the federal cabinet to have exclusive legislative authority over all the "seacoast and inland fisheries" (Tallman, 1975; Thompson, 1974:1972). The exclusivity of this centralized authority has not kept individual provinces from arguing at various times for a greater say in managing various aspects of the fishery resources. However, provinces have not seriously challenged the exclusive federal authority and have not achieved any jurisdictional claims other than what has been clearly delegated by the federal government (Thompson, 1974). In New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland, provincial governments regulate parts of the freshwater fisheries, much of the processing sector, and industrial development. In British Columbia, the province manages the freshwater fisheries except the anadromous species. However, the continuing legitimacy of centralized state power in Canada stems from a focused and overwhelming concern with the protection of the

⁷ Johnston (1977:18-22) argues that at the time of Confederation the new government faced two potentially explosive situations. First, was the need to impose effective fisheries law enforcement on Canadian fishermen, while at the same time control American fishermen were literally getting away with 'murder' in Canadian fishery waters. Second, was the reality that Canadian fishermen had to compete for fish resources with the independent New England fishermen (who felt that they were outside any treaty provisions limiting their operations) while at the same time being dependent on the expanding U.S. market for selling their catches.

fisheries, for example, from large scale intrusions by New England fishermen on the east coast in the 1860's and later by foreign factory trawlers in the 1960's and 1970's (Tallman, 1975:68; Redding, 1979:36). Through the exclusiveness of its legal authority over the fisheries, the Canadian state has created a strong centralized administrative structure that has determined clearly stated positions on most fishery issues and matters right up to the present time.⁸

In Canada, the federal Cabinet has the ultimate responsibility for the management of fishery resources. Within Cabinet one member is appointed as Minister of Fisheries. This person is responsible for the Department of Fisheries and Oceans (DFO) which is the administrative organization for managing fisheries. A consultation convention has developed over the past 15 years to deal with the conflicting tensions that exist between the interest groups participating in the fisheries. The process involved in this convention consists of essentially ad hoc advisory committee meetings where topical issues are discussed with fishermen and processor organizations as well as local provincial governments (see Appendix A).

The policy formation process within this convention generally begins when the Department's senior executives (the Directors General Committee) receive scientific advice on the status of the resources from their own

⁸An important feature of the Canadian fisheries historically has been that the legislation for management (see Appendix A) has always been drafted in such a way as to give extensive discretionary powers and authority to the federal level of government (Thompson, 1974; Tallman, 1975). Thus the Canadian legislation has allowed for decision making to be "relatively direct and expeditious: (Hennessey LeBlanc, 1982:5).

research staff.⁹ After initial review this committee forwards the advice in the form of recommended Total Allowable Catches (TACs) and their own draft fishing plan recommendations to an appropriate fisheries advisory committee for consultation and feedback. After the advisory committees have discussed the proposed catch plans (in closed meetings with selected fishing industry representatives) the final management decisions are taken. The plan is then forwarded to the Minister for approval. The Minister of Fisheries and Oceans has the ultimate responsibility for allocating fish quotas among the recognized fishing interests including the inshore and offshore fleets, the large fish companies, and other countries. These allocations are politically sensitive and so are considered in terms of positive reaction and acceptability by the different fleet sectors, industry, and provincial governments who are affected by the decisions. As Hennessey and LeBlanc observe in their summary of the Canadian management process

one can see how the discretionary authority of the Minister and his senior civil servants is reflected in this process. Scientists and bureaucrats dominate the process until the latter stages at which time consultations are undertaken with the different sectors of the industry (Hennessey and LeBlanc, 1982:4).

The Canadian policy-formulation process is relatively flexible in administrative terms. The federal government (DFO) has a lot of independent autonomy to control the agenda, issues and timetable for the

⁹ A major difference exists between Canada and United States system with regard to the production of scientific information. This work is done by government scientists in Canada and there are no mechanism for representation from the industry, provincial government or public during the development phases.

management process of the fisheries. They can develop, alter and adjust the process almost at will to suit the particular conditions and issues confronting the fisheries as events evolve. Despite these structural advantages however, there is no mechanism that allows formal public input into the process when considering wider political, economic, ecological and cultural factors. As a result the management process involves the Minister of Fisheries and Oceans being subjected to the intensive lobbying efforts of the various interest groups. In Canada, politics plays an important role in the development and modification of fishery management decisions.

At no time was this more evident than after the 1980-81 crisis in the Canadian fishery. After 1981, the industry was once again in disarray and financial crisis, both on the east and west coasts of the country. The state responded by commissioning high profile officials to review the fisheries and recommend policy solutions to address the problems. A Royal Commission (Pearse) for the west coast fisheries and a Task Force (Kirby) for the east coast were struck and both began to recommend policy improvements which again drew heavily on the orthodox theory of fishery management.

The Kirby Task Force studying the Atlantic Fisheries concluded that the causes of the 1981-1982 crisis were related to the over-expansion of fishing effort which occurred after the 1977 extension of fishery jurisdiction.¹⁰ The attempts to control this expansion, Kirby reasoned,

¹⁰Kirby argued that the 1982 crisis had three specific roots including too much optimism following the extension of jurisdiction, resistance to change inherent in the industry and the current politics of the fishery.

failed largely because of the traditional fishermen's resistance to accept change (that is too modernize their industry). Kirby noted that the politics of the fishery conducted at the federal, provincial, and industry levels had inhibited change, sheltered the less efficient, and led participants to pick sides and 'fight-for-turf' (Kirby, 1982:i42). In other words, Kirby felt that orthodox theory's economic objectives (MEY) needed to be re-asserted. That is, the problem was not with the theory, but with the emergent state apparatus which had failed to manage the resources properly. The state had become overly concerned with social and political issues which should have been considered as secondary issues outside of the primary economic issues of the fishery. Kirby recommended that new priorities be set and that in the future Canadian fishery management objectives be ordered with economic viability of the industry having the highest priority.

Similarly, the Pearse Commission studying the Pacific fisheries concluded that the most important need is to trim the numbering of fishing privileges to the availability of fish stocks (over-expansion of fishing effort). By reducing excessive fishing capacity, he estimated that as much as \$100 million annually could be generated in profits to fishermen and the people of Canada. In other words the MEY of the fisheries was not being achieved in the fishery and this explains the fundamental problem of the fishery (Commission on Pacific Fisheries Policy, News Release - September 28, 1982). He, like Kirby, also recommended that the economic viability of the industry must take clear precedence over all other

concerns, if the industry is to survive and prosper.¹¹ This orthodox concern of the state in creating the necessary conditions for obtaining the MEY from the fishery continues the historical connection of management policy being developed and associated closely with the economic interests and welfare of the industrial sector. For example, the conservation needs of particular stocks at times have been totally disregarded (the set harvest arbitrarily increased beyond recommended biological advice levels) as a result of demands by this sector for more resource to ensure the continued viability.¹² As well financial support programs to the industrial sector are periodically created when economic conditions are negative for the individual sector. The Temporary Assistance Program (TAP) 1974 clearly illustrates this selective support. Most of the TAP funds allocated by the state in reality were directed to the vertically integrated large processing companies, even though the crises had affected all sectors of the fisheries (Environment Canada, 1976:1). Similarly, other incentive programs generally in the form of granting non-retractable

¹¹ However, on closer examination, we find that the recommendations of both Kirby's Report and Pearce's Commission essentially re-affirmed the 1976 economic fisheries management objective of "best use" (including minor adjustments for the prevalent social concerns) and so in reality their recommendations remained consistent with the approach that had been guiding policy since EFZJ.

¹² I was present at a January 1980 meeting in Lunenburg, Nova Scotia called as a result of the offshore fishing vessel captains strike against the increased regulatory requirements and resource allocation policies of DFO. Frustrated, the captains with the encouragement of the large company owners (HBN and NSP), demanded a meeting with the Minister to resolve the dispute (discussion - Kingsley Brown). An Assistant Deputy Minister of DFO came from Ottawa to meet with the striking captains and quell the protest. The results were that offshore vessel enforcement no longer had the same priority and that negotiations for a larger offshore share of the 4VSW cod TAC began.

grants have been consistently provided to this sector to increase private company diversity and ensure continued viability (i.e. the Northern Cod Incentive and Fleet Diversification Program in 1981). Many support programs for the industrial sector were implemented during the very period that Kirby and Pearce were arguing that the Canadian state had been overly concerned about the non-economic concerns of traditional fishery sectors. It has been noted by some researchers that the first priority of Canada's fishery management policies has always been and continues to be directed towards addressing the economic concerns of the corporate sector of the fishery, while the concerns of traditional dependent fishermen, local communities and small plants have been a distant second (Williams, 1985). The state policy support for the interests of the dominant sectors over other sectors of the fishery reflects the orthodox theory approach. That is orthodox theory is founded on the assumption that because the stability of the fishery depends entirely on the stability of the dominant large company sector, state policies must therefore focus on ways to support and strengthen this sector.

B. Decentralization and Anarchy:
The U.S. Fishery Management System

The United States federal state has never been seen as a strong proponent of fishing industry interests (McEvoy, 1986; McHugh, 1987). For example, up to 1976, the U.S. state had consistently sought in international forums to limit the seaward extension of local coastal state jurisdictions. The U.S. state has instead, chosen to support and preserve the historical principles such as unfettered freedom to use the marine

resources and the right for unrestricted passage of vessels on the high seas (Mangone, 1977). This federal state position while supporting the military and other marine based industries (such as oil, marine trade fleets, etc.) seriously alienated the local domestic fishing interests, who like their Canadian counterparts, consistently yearned for national extended fisheries management jurisdiction.¹³

Compared to the situation in Canada, the fishing industry of the United States has historically been of minor importance to its overall economy or international interests. Ann Hollick observed that, "Since fisheries policy is scarcely a prominent concern in the hierarchy of national policies, the full weight of governmental influence would never be brought to bear in this area" (Hollick, 1978:62).

The United States fishing industry has always been structured by market place economics and local community interests. For example, since WWII, the U.S. fishing interests has been subjected to and affected by a general contraction of the total industry. This is reflected in a decline in employment levels and capital investment. For example, the average age of fishermen has increased and the capital equipment of the harvesting sector is largely obsolete (see Smith and Peterson, 1977; Peterson and Tierkla, 1987). This illustrates the economic marginality of the industry relative to the other sectors of the overall economy.

Prior to 1977, under the American constitution, responsibility for managing the fishery resources had always been the sole responsibility of

¹³ See International Court of Justice: Case concerning delineation of the Maritime Boundary in the Gulf of Maine Area [Canada/United States] Reply submitted by U.S.A., 12 December 1983:13.

the coastal states. In 1976, however, the federal government was forced to assume some management responsibility for fisheries beyond the coastal state marine boundaries. Pushed by the growing international consensus for establishing exclusive management zones which it had historically opposed, the federal state was forced to reverse its traditional stance of favouring international freedom of the seas principles and passed the FMCA, 1976, thereby claiming an exclusive 200 mile Fishery Conservation Zone (Snow, 1978:298-299).¹⁴ The FMCA, 1976 legislation defined for the first time management responsibilities for the U.S. fishery resources at a federal level.¹⁵ The legislation was drafted in such a way as to share the responsibilities for fisheries management between the federal and state government levels and the general public (Magnuson, 1977). It established and assigned different species management plans, licensing foreign fleets and defining fishing boundaries offshore from individual state and protectorate marine jurisdictions to different institutional agencies. For example, the federal National Marine Fisheries Service (NMFS), Regional Management Councils and individual state governments all

¹⁴ The local fishing interests in United States, had conducted for many years before the FMCA, 1976, a long and arduous campaign seeking protection of their fisheries from the harvesting efforts of foreign fishing fleets off their coastlines. However, other important interest groups including the military, oil and marine industries had been able to exert more public policy influence on the federal state and override these smaller local campaigns.

¹⁵ In addition to the FMCA, 1976 a number of other federal laws also directly affect the U.S. fisheries management process. Some of these other laws include the National Environmental Policy Act, 1970, the Executive Order 12291, 1981, the Federal Advisory Committee Act, 1976, the Freedom of Information Act, 1976, the Administrative Procedures Act, 1976, the Regulatory Flexibility Act, 1981, and the Paperwork Reduction Act, 1981 (Hennessey and LeBlanc, 1982:25-32; NOAA, 1986:3).

have fishery management responsibilities (see Appendix B).

The FCMA, 1976 legislation created a formal system for managing fishery resources within the new Fisheries Conservation Zone (FCZ) according to species fishing plans. Developing the fishing plans is the responsibility of Regional Management Councils which by law must consist of representation from both the processing and harvesting sectors as well as other interested public members. The fishing plans must also meet national standards which again are set out in legislation.¹⁶ Eight Regional Management Councils were created under the FMCA, 1976 legislation and their authority is separate from the federal government's.¹⁷ Membership of these regional councils must include representatives from each coastal state, a federal representative (usually from NMFS) and knowledgeable non-governmental fisheries representatives from the region

¹⁶ These national standards are that: conservation and management measures must prevent over-fishing but achieve optimal yield for each fishery; these measures must be based on the best scientific information available to the extent of practical, and additional stock of fish should be management as a unit throughout it's range; conservation and management measures should not discriminate between residents of different states; the measures should promote efficiency in the use of fishery resources; the measures shall take into account variations among fisheries and fishery resources and catches; where practicable, they should minimize costs and avoid unnecessary duplications (United States Department of Commerce 1978:1-7).

¹⁷ The sole responsibility for nominating Council members rests with the individual state governors represented on the Regional Management Council. The federal role is to review the Regional Fishery Management Councils species fishing plans, draft regulatory provisions, enforce the provisions with other agencies, undertake scientific research, and provide administrative support for licensing and statistical collection (Peterson and Tierkla, 1987:18).

who are appointed for a three year term (Redding, 1979:246).¹⁸ Each Management Council Committee has an elected Executive Committee which hires their own staff, contracts for the necessary biological and socio-economic advice from the private sector and universities, and organizes their own species committees for developing plans. Council members vote on all issues requiring decisions. The process allows local state governments and selected industry representatives a strong say and influence on the United States fishery management policies.

Regional Management Councils are required to hold public hearings during each major phase of plan development. The public has an opportunity to attend meetings and comment at several stages of development before a species fishing plan becomes final and implemented. Although the Secretary of Commerce retains the final authority to approve or disapprove implementation of a species fishing plan there is formal public accountability and involvement throughout the entire process. The Secretary is guided by the Council's species fishing plans and does not have independent authority to create new management policies without the Council's approval. The exception to this general rule is an emergency management authority held by the Secretary of Commerce under Section 305(e) of the FCMA, 1976. Under this authority the Secretary can prepare a species fishing plan if a particular Council fails to do so within a

¹⁸ For example, the New England Fishery Management Council has one representative each from Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut, one from NMFS, and eleven from industry representing the interests of the fishermen and community levels of each state for a total of seventeen members. As well, other agencies such as the Coast Guard, State Department, and other fishery Management Councils and Commissions are represented by non-voting members.

reasonable period of time.

Unlike the Canadian process, the U.S. procedure follows a strict timetable schedule. There are time specifications and public meeting requirements at every stage of the process. Any major amendment to any species fishing plan requires a full public hearing. Although this arrangement guarantees local representation and input into the decision making process, Peterson and Tierkla (1987) write that the results in practice are less than ideal. For example, they point out that the New England Fishery Management Council (NEFMC) is the setting of much conflict both internally and externally. The Council must deal in an environment where adversarial relationships with other external agencies exist and also where management responsibilities conflict with the individual and interests of its internal membership. Since the Council has institutionalized fishing industry input, votes on policy are cast by not only members who work for fishing companies, but other interest group members including recreational fishermen, fishermen and leaders of fishery organizations.¹⁹ The results, Peterson and Tierkla argue, when compared

¹⁹ Peterson and Tierkla note that the NEFMC has formed a number of species committees for each fishery being managed. Members of these committees are appointed by the Council's Executive Committee. The species committees in turn are provided with advice from Advisory Committees made up of representatives from individual firms, fishermen associations, recreational enthusiasts, and academics. For example, the Groundfish Advisory Committee has over 50 members that can potentially contribute to meetings. They also bring attention to the fact that any individual person (of the many thousand of fishery participants) can influence the approval process for any plan (because of any personal dissatisfaction with a plan provision or new regulation) either by raising it publicly at a regular Advisory Committee Meeting, or by holding back their comments until plan details are formalized, and then lobbying behind the scenes for changes, using threats of non-compliance if approval is given (Peterson and Tierkla, 1987:14-19).

to the Canadian situation, is that achieving integrated fishery management plans is almost impossible because of the competition and conflict involved in the entire process. As a result plan development is extremely lengthy and in the end essentially ineffective because of the many legislative steps involved and availability of procedural mechanisms for blocking FMP at any given time.²⁰ The planning process takes a minimum of 287 days and may take longer (U.S. Department of Commerce, 1988:39-50). Since the biological status of any fish stock can change dramatically in a short period of time, a plan approved within this type of process is often implemented even though the premises upon which it was originally based are often no longer valid.

Peterson and Tierkla (1987) also write that many of the states have in practice given fisheries management authority to individual towns for specified fisheries. This arrangement is further complicated in cases of the migratory species where developing a coordinated approach to management becomes quite problematic, considering the levels of federal, state and regional authority involved.²¹ As a result, for some migratory species that are trans-boundary, management conflicts do arise between

²⁰ The U.S. planning process takes place in seven distinct phases including pre-planning, draft fishery management plan development, public review and council adoption, secretarial review, regulation promulgation, continuing fishery management, and FMP amendments (Hennessey and LeBlanc, 1982:23).

²¹ For a good example of the jurisdictional problems that can arise from state/federal relationships in United States is illustrated in an article entitled "State-Federal Issues Raised by Regional Attempts to Manage Lobster Fishing" in Marine Law Institute Vol. vi, Number 4, December 1986. The article discusses the implications of nationwide restrictions on lobster fishing in terms of whether state authority under the Magnuson Act would be usurped by the federal government.

towns, states, federal/state and industry interests.²²

Furthermore, since there is no formal method for determining, quantifying, and incorporating economic, political, cultural or ecological factors into the management decision making process, the regional management councils do not function efficiently. This is primarily because of the many conflicting interests involved in the process all of whom have voting rights. As a result the fisheries of the United States are extremely individualistic, competitive, and pluralistic. They do not have one fishery but many fisheries, they do not have several interests they have many interests, and so the lobbyists are very important and very active (Redding, 1979:257).

Despite the numerous federal legislative requirements involved in the U.S. Fisheries management process, the most noteworthy aspects may be what the legislation does not address. In the United States there are yet no consistent methodology or general provisions to limit entry into a fishery, unless actually specified as a particular measure in a species fishing plan. This means that there are no available management mechanisms for controlling total fishing effort and investment in a fishery. In addition, the U.S. legislation has not restricted the powers of individual coastal states from managing the fisheries within their own territorial three mile limits as they see fit. This results in numerous local regulations being developed by individual states which often conflict with the overall management objectives of the Regional Management

²² This situation in the United States has fundamentally affected its fisheries relationship with Canada during periods of negotiation and conflict throughout history.

Councils and federal state.²³ Since many fish stocks are migratory and move over the boundaries of coastal states jurisdictions throughout the Extended Economic Zone, the legislative deficiencies and overlapping responsibilities create complex administrative problems (both domestically and internationally) that are difficult to impossible to resolve.

4. Conclusion

This Chapter has shown that both the United States and Canada have fishery management objectives that stem directly from the orthodox paradigm of fishing management. In order to translate these objectives into practice each country has had to create it's own particular administrative structures and processes. The Canada and United States structures differ significantly because of different political, economic, and cultural contexts within which they have developed. In Canada, fisheries management is under the total jurisdiction of the federal state (see Appendix C). This reflects the importance of the fishing industry to the national economy, it's concern for regional disparities, and the reality that Canada has depended historically on a mixed public/private sector economy. Legislation gives discretionary power to the federal government to develop coherent fisheries management approaches within

²³ It should be noted, however, that there is a mechanism in place under the FMCA, 1976 that can limit or restrict state powers in certain cases. For example, if a Regional Fishery Management Council species plan is ever jeopardized as the result of either an inaction or action by an individual state the federal state can intervene with the imposition of overriding restrictions. This federal power has not been used in any fishery to date.

which it's fishery objectives are concretized. Decision making for the fishery resources lies mainly at the federal level and it is legitimated through a consultative process. Selected fisheries interest groups are heard within this process but it is entirely up to the federal government which advice will be heeded and what fishery management decisions will be taken. With this kind of system, decision making is relatively expeditious. As a result fishery management plans are developed, implemented and enforced on a coherent and regular basis (usually on a yearly basis). These plans have as their primary aim the creation of the conditions for ensuring that the industry is operated on an economic basis (i.e., viable and efficient), while at the same time acknowledging a concern about the social and cultural dimensions of fisheries. The fact that the Canadian fishing industry is not economically stable is attributed by orthodox economists to the government's exaggerated concern for the social and political aspects of the industry at the expense of the economic aspects. Critics attribute the industry's continued instability to the government's ad hoc support of the large corporate sector over the interests of the small and medium size fishermen and processors who compose the fishing communities.

In the United States, fisheries objectives are enshrined in the FMCA, 1976 or Magnuson Act. This legislation details and specifically delegates management responsibilities and authority for managing the fisheries to the federal and state governments and local fishery participants. This legislation reflects the fact that the fisheries are not a major concern for the U.S. economy, but rather are important only to particular coastal states and regions of the country. This also

reflects the general U.S. view that government should stay out of the industry. Under the U.S. system each individual participant has access to and can influence virtually every fishery management decision under consideration. Except for an ambiguously defined responsibility for ensuring overall stock conservation, the federal government is excluded from the formal decision making processes which defines how the resources are to be harvested and used. Decision-making takes place at the local, state, and regional levels in Regional Management Councils. Since participant interests are so diverse, (consisting of virtually all interested commercial and recreational fishermen, as well as small and large processing companies and the general public), the development of acceptable management plans and policies becomes an impossibility. Because the federal government provides no coordinate guidance or sustaining support to its fishing industry, the fishery participants are much more subjected to the vagaries of market forces than is the case in Canada. The fact that the U.S. fishing industry has been over-fishing and destroying its groundfish resources is attributed by orthodox theorists to the management process being too democratic and the failure of the state to exert control over common property resources.

CHAPTER FIVE

Policy and Practice:

A Case Study of the Groundfishery

1. Introduction

This chapter focuses on how the fishery objectives of Canada and United States systems have been concretized into policies and what success these policies have had in achieving the objectives. Using examples of representative policies used to manage the groundfish resources¹ of Atlantic Canada and Northeastern United States, I show that not only do these management policies significantly differ between the two countries but they also differ in practice from the expectations of the theories themselves.² I argue that the differences in both cases result from intervening political, cultural and economic influences which modify or undermine the policies as they are translated into practice. I use these differences as evidence that orthodox perspective theories and policies

¹ Groundfish or bottom dwelling fish is a term used to describe several commercially important species of demersal finfish inhabiting the continental shelf of the northwest Atlantic. Groundfish species include; cod, haddock, redfish, halibut, American plaice, yellowtail flounder, witch flounder, Greenland turbot, winter flounder, pollock, white hake, cusk and catfish. The five most important species historically and economically to the U.S. and Canadian fishing industries are Atlantic cod, haddock, yellowtail flounder, pollock and redfish.

²The differences between the two countries essentially lies in the extent that they have been able to establish systems of rights over the marine fisheries. In the United States, management measures are largely non-exclusive (access to the resources is unlimited) while Canada has developed exclusive measures (access is controlled).

fail to explain fishery problems or to provide adequate and predictable policy solutions. With this evidence, I conclude that the theories are essentially rationalizations by orthodox perspective proponents for supporting the interests of the industrial fishing sector over the interests of the traditional sectors.

2. Policy in Practice: Groundfish Management in Canada

Success or failure in achieving the specified management objectives for Canada's groundfish fisheries (resource rebuilding, conservation and the promotion of industrial stability) depends largely on the level of participant agreement for the annual AGMPs and the regulatory policy measures implemented to control fishing effort. In the next section I show how two important control methods, which are clearly drawn from orthodox theory, have been developed and used to manage the Atlantic groundfish fisheries.³ These two methods are appropriate for illustrating my argument because they are particularly characteristic of the Canadian fisheries management approach, as well as the types of policies orthodox theory promotes. These methods are limited entry policies⁴ (input controls) and quota and enterprise allocation (EA) policies⁵ (output

³See DFO Documents 1968-1988 and Government of Canada Documents 1973-1988 in Bibliography.

⁴Limited entry is a method for establishing exclusive harvesting privileges for fishermen by controlling access to the fishery resources.

⁵Quotas (and EAs) are methods for establishing property rights for fishery resources and allocating fish shares between fishermen and fishing companies. They can be categorized as catch quotas (i.e. TACs or fleet sector /gear type quotas) or company quotas (enterprise allocations).

controls).

A. Limited Entry Policies

The theoretical basis supporting the use of limited policies arises from the orthodox understanding that fishing effort in any fishery has a tendency to grow in an uncontrolled manner. The solution proposed is to restrict participant access (input) to the fishery and control any future potential growth in fishing effort (Meany, 1975,1977,1979,1980; Mundt, 1974; Nielson,1976; Sanders, 1972,1975). As we saw in Chapter one, orthodox theory argues that the build-up of effort in a fishery is an organizational problem resulting from the fact that open access resources cannot be protected from excessive fishing. By controlling the number of participants and vessels, it is argued that the state is able to tailor the total amount of fishing effort to the long-term availability of resources.

In Canada, access is controlled by the federal state which since the early 1970s has developed and imposed comprehensive licensing policies on fishery participants. The state represented by the Department of Fisheries and Oceans (DFO) requires commercial fishermen and fishing vessels be licensed in order to conduct harvesting operations and land catches from the Atlantic groundfish fisheries.⁶

⁶ Limited entry is now an integral part of the Canadian management approach. Licensing policies now apply to not only all Atlantic commercial groundfish fisheries but also the pelagic and shellfish fisheries.

DFO has used several rationales to justify the imposition of restrictive licensing policies. One reason has been to fulfil what orthodox theorists see as a primary role of the state. That is to support those sectors of the fishing industry who have made the largest capital investments and contribution to the overall economy by helping ensure their certainty for a share of any potential harvests. This support, it is argued, indirectly benefits the other less capitalized sectors of the fishery through economic spin-off effects created by the dominant sectors. Another reason is that limited entry measures help create the necessary conditions for sharing resource management responsibility between the state and the user participants. Co-sharing is ideal for society, it is argued because those participants who have the strongest attachment and commitment to the fishery are also the best suited to assume responsibility for their long-term husbandry and conservation. Finally, and perhaps the most important reason is that limited entry policies impose the necessary conditions to allow industry to become more efficient. Productive efficiency must be the primary management goal orthodox theorists argue if the benefits of the fishery are to be optimum for society.⁷ Efficiency, for the state is defined in terms of firm efficiency. This definition of course favours those participants and companies making the largest capital investments in the fishery. Other participants, including those who are tied to the resources for cultural

⁷ The rationale for limited entry policies is supported by the orthodox notion that it is not economically efficient for a fishery to have a larger than necessary industry capturing and processing the available resources. Rather a fishery to optimize benefits should be exploited by fleets/plants that are of a size which allows economic viability for all participants during average levels of fish availability.

or historical dependency reasons or who are operating small scale vessels on a seasonal or part time basis, are considered less capable of becoming an efficient sector and so their interests are dismissed as less relevant.⁸

How have limited entry policies worked in practice over the years and have they achieved the fishery management objectives expected of them in the Atlantic groundfish fisheries? In order to answer these questions some understanding of Canada's limited entry policies is in order. The following is a brief overview of the developments that have led to the present day limited entry policies used in Canada to manage it's Atlantic groundfish resources.⁹

Canada's imposition of limited entry policies began in earnest on August 13, 1973, when the Minister of Fisheries, Jack Davis announced a three month freeze on government construction subsidies for fishing vessels greater than 35 feet in length and a freeze on the issuance of new licences for groundfish vessels greater than 65 feet in length. The

⁸The definition bias which favours the larger capitalized sector is reflected in how companies perceive their contribution to the regional economy. For example, Gordon Cummings, President and Chief Executive Officer, National Sea Products (NSP) speaking before the Senate Committee of the whole on the Canada-France Fisheries and Boundaries Agreement described his company's stature and role in the following way "National Sea is Canada's largest fish based food company and one of the largest vertically integrated fishing companies in the world. We own and operate 59 vessels and provide employment for more than 8,000 people. However, we are more than just a large offshore fishing company. National Sea is deeply involved in every sector of the Atlantic fishery. It is the second largest private-sector employer in the province of Newfoundland. For many communities.....there is no economic alternate, since National Sea purchases the daily catches from hundreds of inshore fishermen who fish the coves and inlets all along the shores of Newfoundland" (Senate Debates, February 17, 1989:532).

⁹ With respect to licensing fishermen, the Canadian federal government's legislative authority is restricted to the tidal waters. Non-tidal waters are subject to the property right provisions of provincial legislatures and therefore licensing for resources in these waters are their responsibility.

reason was to provide the government an opportunity to review it's fleet development and subsidy programs. This review was caused by the dramatic increase in fishing vessel construction which had depleted federal subsidy funds being offered at the time. This fishing vessel construction boom had been encouraged by high groundfish prices, by provincial governments pushing development programs and by the anticipation of increased availability of resources for Canadian fishermen.¹⁰ After the review, the Minister announced new policies that focused on matching the number of fishermen and fishing vessels to the availability of resources. The policies included; a continued freeze on the issuance of offshore licences, introduction of a universal licensing programme¹¹ and the establishment of licensing advisory committees.

For the offshore fishing sector (vessels >65 feet in length) an Offshore Groundfish Advisory Committee (OGAC) consisting of selected company representatives was established in the spring of 1974. In the following year (April 1975), the then Minister of Fisheries, Romeo LeBlanc approved new policies based on OGAC advice for licensing offshore fishing vessels in the future. The policies consisted of guidelines establishing the terms and conditions for existing licence holders, the rules for replacing licensed vessels and the process for deciding licence eligibility for new entry vessels. As well, a list of reserve unrestricted

¹⁰ The anticipation was fuelled by ICNAF which began considering larger country allocations for Canada, as well as the UNCLOS III negotiations which were progressing in the direction of extended jurisdictions over marine resources for the coastal states.

¹¹ The universal licensing programmes included not only the groundfish fisheries but also all the other important commercial fisheries including; the lobster, scallop, salmon, herring, snow crab fisheries,

licences was established to account for those vessels lost at sea, scrapped, or sold during the period when the restrictions were imposed (i.e. 1968-1973).¹²

Later on June 17, 1976, Romeo LeBlanc, placed a moratorium on the reserved list of licences (Environment Canada press release). He justified the moratorium by reasoning that there was already insufficient availability of groundfish stocks to support the existing fleet. The action of the Minister and the economic concerns of the larger fishing vessel owners, who at the time faced increased threats of future harvesting competition, coincided. This was an important factor which reinforced the legitimacy among the larger company owners for the limited entry policies at this time. From 1976 to the early 1980s when EAs were first introduced, the licensing policies governing the offshore groundfish fleet sector have remained essentially the same, aside from some procedure adjustments for approving licence requests.¹³

However for the traditional groundfish fishery sector (vessels less than 65 feet in length), increasingly restrictive licensing policies were being put into place after the declaration of the EFZJ on January 1, 1977. By 1979, the pressure being exerted on DFO by fishermen for fishing

¹² Vessels on this reserve list could only be reintroduced into the fishery under specified conditions. Although holders of reserved licences (companies) were free to re-introduce their licences into the fisheries, the scarcity of fish and difficult financial times that the industry was experiencing resulted in very few doing so.

¹³ Romeo LeBlanc decided to personally approve or reject all offshore licence requests rather than having DFO employees making decisions. This decision-making prerogative has been retained by all federal Fisheries Ministers since LeBlanc. In making their decisions they can take into account the political considerations at stake when deciding to issue new licences.

privileges appeared to be increasing almost as a direct result of the limited entry policies. An internal DFO review, the Levelton Study, was undertaken to provide recommendations for licensing the inshore fishing fleet. Two key recommendations from this study included the development of a procedure for categorizing fishermen and a significant licence fee increase (Levelton, 1979). By 1980 many of Levelton's recommendations had been acted upon and imposed on the traditional fishing sectors. Later, as a result of another fishing industry crisis, the TASK Force on Atlantic Fisheries (Kirby, 1982) made it's own recommendations for licensing inshore fishermen, which in turn were adopted and imposed by the federal government. These policies of the state continued the trend of imposing more and more restrictions on the operations of the traditional fishing sectors of the fishery. For example, fishermen were now being categorized as either full time or part-time, the traditional rights to fish were being assigned as fishing privileges to qualified fishermen and the geographic operating territory of inshore vessels was being reduced as a result of the administrative reorganization of DFO (DFO Sector Management, 1981).¹⁴

By January 1989, the Minister, Tom Siddon released the latest version of the Atlantic coast licensing policy (DFO, 1988). This policy, once again re-affirmed the state's orthodox understanding of fishery problems and continued it's justification for limiting access to the

¹⁴ Many of these restrictions were not readily accepted by inshore fishermen and smaller plants owners who depended on their catches. As a result a great deal of political pressure was exerted on both DFO and the government to have these new licensing policies changed or modified, however without much success (Discussion Paper Commercial Fisheries Licensing Policy for Eastern Canada, December 1985).

fisheries as necessary

to provide for an orderly harvesting of the fishery resource, to promote satisfactory incomes to the average participant and, finally, to adopt policies which are consistent where consistency is desirable and practical, while at the same time recognizing that specific unique measures may be necessary for specific fisheries and geographical locations of Eastern Canada (DFO, 1989:1).¹⁵

The expected benefits after the limited entry policies were implemented for the groundfish fisheries have remained consistent over time and are presently prioritized in the following way: first, to aid in the conservation of resources; second, to promote the stability and economic viability of fishing operations; third, to promote equitable access to fisheries resources and; fourth, to promote orderly fleet development by limiting the number, size and types of new vessels (DFO, 1989:3-4).

Achievement of these expected benefits would have greatly supported and enhanced the limited entry prescription for fishery problems. However, in practice we see that the results of the policies over the past 15 years have been somewhat different from the expectations and rhetoric of their proponents. Some of the unexpected results, in addition the failure to protect the resources in the longterm from over-fishing have included: a dramatic growth in inequality and conflict between fishermen and fishing fleets (instead of state-public sharing of responsibilities); a failure to resolve the inherent economic instability of the groundfish industry (instead of providing the basis for a more stable, viable industry) and; an inability to control the increase in the harvesting

¹⁵ Inshore fishermen's reaction to the policy provisions has followed the traditional pattern set since the early 1970s and been hostile.

capacity of the fishing fleet (instead of the creation of a smaller, efficient industry).

8. Limited Entry Practices: Unexpected Results

Limited entry policies are promoted as a means for providing not only greater opportunity and equality for fishery participants, but also an opportunity for them to assume greater management responsibilities (Mikalsen, 1985). However, in practice, the results for Canada's groundfish fisheries do not indicate that this has occurred (Needler, 1979; Nicholson, 1981; Sinclair, 1987; Surette, 1984). The process of categorizing fishermen and their vessels according to operation size, mobility and gear type has, in reality, restricted the opportunity to fish for large numbers of fishermen. At the same time, the introduction of limited entry policies have encouraged the establishment and tremendous growth of a new highly technical and very competitive harvesting component to the fisheries. Some licensed vessels (draggers) have been progressively replaced by larger more capitalized and specialized vessels and in effect have formed a new fishing component with a greatly increased harvesting capacity. The new component has come to dominate the traditional inshore fishing fleet sectors, disrupting historical fishing patterns and reducing or eliminating opportunities to fish. These changes have increased the level of conflict between fleet components, distorted the traditional economic character of the fishing industry and lessened the aggregate operating flexibility of the overall Atlantic groundfish fleet, especially

the traditional inshore fleet sector after 1976.¹⁶ For example, in Nova Scotia, since the 200 mile limit was declared, community based vessels along the Eastern Shore have not been able to successfully access and take their share of the groundfish resources adjacent to their communities.¹⁷ The reason is that highly mobile offshore company-owned trawlers and smaller specialized draggers from other areas (such as southwestern Nova Scotia) have been able to catch the quotas before the eastern shore vessels can physically leave their harbours in the spring. Many of these outside vessels have financed their technically advanced and efficient vessels with a combination of state supported subsidies (in the case of offshore company owned vessels) or by having the easiest accessibility to rehabilitated stocks¹⁸ adjacent to their own communities (in the case of many SWNS dragger vessels). Because the licensing policies do not differentiate between participants and objectively treat all fishermen and vessels equally on paper, they in practice provide a competitive advantage for the newer technically advanced vessels over the less advanced

¹⁶ Fishing vessel specialization had previously only been a characteristic of the larger, vertically integrated companies operating offshore vessels greater than 65 feet LOA.

¹⁷Michael Belliveau, Acting Executive Secretary, Maritime Fishermen's Union uses this development as one example of how state policies work against the traditional fishing sectors during his presentation to the Senate committee of the Whole (Senate Debates, March 24, 1987:715-717).

¹⁸ICNAF efforts in the early 1970s to rehabilitate the haddock stocks on Brown's and Georges Bank succeeded after specific controls were imposed and respected by the international fishing fleets. This created an opportunity for coastal dragger fishermen to exploit a readily available and highly marketable resource. Using their unusually high incomes dragger owners re-invested in their operations, using larger more specialized vessels. The newer vessels were capable of fishing all year and at greater distances. This resulted in the available local fish quotas being captured faster and thereby shortening the fishing opportunities of other fishing sectors.

traditional vessels.¹⁹ The licensing policies rather than decreasing inequality and destructive competition, have in practice increased inequality and competition in the groundfish fisheries. That is, limited entry measures do not result in an even playing field for equal and fair competition, but instead provided conditions that favour specialized fleet sectors to the detriment of the traditional sectors.

Another result of Canada's licensing policies has been the failure to overcome the fishing industry's characteristic instability. As fishing vessels increasingly specialized their operations using highly capitalized equipment and concentrating on only the highly marketable fisheries, (for example cod, haddock, redfish and later pollock) they became more vulnerable to the biological and market fluctuations of the fisheries. The economic viability of these specialized vessels change whenever either the availability of resources or market conditions upon which they depend changes. As a result, specialized vessel operators are forced to appeal to the state for support in order to survive periods of economic downturn, largely because no alternative uses for their vessels exist. Traditional multi-purpose vessels, which are characteristic of the inshore sector have historically been much more capable of changing operating patterns as biological or marketing conditions varied. Therefore it can be argued that limited entry policies, rather than increasing overall fishing

¹⁹Michael Belliveau, Acting Executive Secretary, Maritime Fishermen's Union speaking before the Senate Committee of the Whole on the Canada-France Fisheries and Boundaries Agreement classified for the Senators the differences between the fishing fleet sectors by noting "you must make a distinction between inshore and midshore. When I say 'midshore', I am talking about vessels in the 60 to 65 feet range, usually draggers. These boats have a lot of fishing power. They also have a lot of political power (Senate Debates, March 24, 1989:722).

industry stability as the theory predicts, have actually increased the instability that is now characteristic of Canada's groundfish fisheries.

Another result not anticipated by theorists promoting the imposition of limited entry control measures has been the failure to tailor fleet harvesting capacity (fishermen/vessels) to the availability of groundfish resources. Since 1973 when the first restrictions were imposed in the groundfish fisheries, the total catching capacity of the fleet has not decreased as the theory anticipates, but has dramatically expanded. Despite having limited entry policies in place for over 15 years, the Minister of Fisheries and Oceans was forced to form a joint DFO/industry committee to deal with what was now termed the persistent overcapacity problem in the Scotia Fundy groundfish fleet (see Appendix D). The committee held extensive consultations and submitted a report with recommendations. In their study, they determined that problems had been developing well before 1977. The committee found that not only was the existing fleet over-fishing the available resources but that they had capitalized their operations to the point that they were also not even utilizing their potential catching capacity. Specifically the committee estimated

that inactive capacity in the groundfish fleet is as large as the active capacity. In other words, the fleet has the potential to exert four times the effort required at F0.1." (DFO,1988:2)²⁰

This review of several unexpected results of Canada's limited entry

²⁰However the recommendations of the capacity committee which were presented to the fall meeting of the AGAC re-enforced the orthodox approach of treating fishermen as individuals and placing limits on their operations.

policies in practice illustrates the shortcomings of management policies which are based on orthodox theories. That is the theories fail to account for any of the implications that arise once they have been applied as policy. As a result, when orthodox policies are imposed, more problems seem to be created rather than are resolved.

C. Quota and Enterprise Allocation Policies

Canada's system of quotas and enterprise allocations (output controls) in the Atlantic groundfish fisheries is the other characteristic fishery management method I use to illustrate my argument. The system involves setting a Total Allowable Catch (TAC) and a process for sub-allocating quotas to fishery participants. The system dates back to Canada's membership in ICNAF. The allocation process divides the TACs into catch quotas, which are in turn allocated to the different fleet sectors in the form of competitive quotas (for the inshore fleet sectors) and exclusive quotas or EAs (for the offshore fleet sector) according to the AGMP. As already discussed in Chapter 1, the orthodox perspective theories of the 1950s and 1960s argue that the open access (later modified to the common property) character of the fishery is the root cause of over-fishing. The theory is based on the assumption that by simply changing the character of the fishery, the causes of over-fishing can be resolved. Changing the character of the fishery, orthodox theorists proposed, can be done by allocating portions of the Total Allowable Catch (TACs) in the form of quotas (later modified to EAs), directly to fishermen or companies. Orthodox proponents felt that by removing

competition from the fishery, participants are no longer forced to engage in a destructive race to fish in order to acquire a share of the resources. Quotas and EAs thus enable fishery participants to plan their fishing operations and remove their incentive to over-fish. This allows participants to reduce operating costs and optimize market opportunities.

It was assumed that natural economic forces, would reduce the number of fishermen and fishing vessels to the availability of harvestable stocks and existing market conditions.²¹ Therefore some of the more important expected benefits promoted for quotas include: protection of fish stocks from over-fishing by capping the total harvest level that can be taken from any fish stock; more orderly harvesting activities; more efficient use of capital and labour; and a more equitable distribution between the participants of the harvests.

The subsequent development of EAs is an excellent example of the continual revision or modification of failing orthodox based policies. In the early 1980s, EAs were introduced for offshore fishing sector as the means to address the larger company owners concerns that their operations had become over-capitalized. The causes of this over-capitalization at the time were blamed on the failure of the groundfish quota management policies. The policies, as we saw earlier, had initially focused on the open access character of the fishery. This focus was revised and modified in order to maintain legitimacy. The theories began emphasizing the common property character as the key problem to be addressed (Harding, 1968). The common property concept was proposed, as

²¹ The reduction of fishing effort would also create the necessary conditions for efficient harvesting and processing operations in the industry.

a term more applicable for describing the character of the fishery which inevitably leads to over-fishing and industrial inefficiency. By identifying and emphasizing the property dimension of the fishery as the key problematic, the theoretical justification for EA policies assigning property rights directly to individuals and companies by the state was in place.

The assumption underlying EAs therefore, is the same orthodox notion that contends individual or private companies must have maximum flexibility and freedom to re-organise and rationalize their operations in order to optimize benefits. This need for flexibility is based on the understanding that free market principles are the most effective means for achieving industrial efficiency (or maximize profits). The expected economic benefits used to justify the implementation of EAs reflect the same justifications used earlier for the imposition of quotas and essentially include; increased labour and capital efficiency, improved quality and marketing conditions, as well as more orderly harvesting and processing operations (DFO, Press Release, December 30, 1989).

In addition to these strictly economic benefits for companies, promoters of EAs argue that fishing industry workers (fishermen and plant employees) also benefit. The expected benefits for them include; increased average incomes, a less regimented and exhausting work environment, and increased employment opportunities.

Finally the EAs are promoted as a means to further clarify what is termed the different and proper role to be played by the state and the private sector in the fishing industry. By allowing a company the opportunity to rationalize it's operations (by using it's guaranteed share

of the resource in whatever manner they wish), the private sector role would be directed towards developing a more efficient and stable industry. Likewise, after initial assessment of the allocations had been permanently assigned to companies, the state's role could be significantly reduced and focus on assessing of fish stock productivity, monitoring fleet harvesting operations and enforcing regulations.

Beginning in 1981, EAs were temporarily assigned and exclusive harvesting privileges for the Atlantic groundfish resources were allocated directly to the larger offshore companies (at no initial cost to them).²² Participation in the EA program was restricted to those companies who held offshore groundfish fishing licenses (vessels greater than 100 feet length overall (>100'LOA)) and who had a history of active participation in the groundfish fisheries. The % share for each participant was pre-determined in closed negotiations held between company representatives and DFO and provincial government representatives. The calculations involved complicated formulae based on historical catch patterns, company catch capacity, adjacency to resources and relative fishing performance. The allocations were set for a trial period of five years and based on a percentage share of each TAC. The five year period was intended to allow enough time for the companies to reorganize and scale

²² These companies operated trawling vessels greater than 100 feet LOA fishing groundfish resources along the Atlantic Coast. Each offshore vessel carries a crew of 12-15 persons, uses an otter trawl and operates 24 hours a day while at sea. The average trip duration, port to port is about twelve days. Offshore vessels fish 12 months of the year and except for short periods in the winter months are not affected by poor weather. The offshore fleet is permitted to fish anywhere along the Atlantic coast (Davis Strait to Georges Bank) and on average they land collectively about million metric tonnes of fish each year or percent of the total groundfish catch.

harvesting/processing operations in order to optimize their share of the resource in relation to existing market conditions. As well, proponents termed the EAs as a trial in order to allay the concerns that other fleet sectors, especially the inshore, began having over the direction that fishery management policy was taking.²³

Successful achievement of fishery management objectives by Canada's system of quota and enterprise allocation policies in the Atlantic groundfish fisheries, would have (like was anticipated for the limited entry policies) increased legitimacy for orthodox prescriptions to fishery problems. Although the quotas and EA policies in theory offered management options that aimed at creating an economically viable fishing industry and protecting the fishery resources from over-fishing, the results during the past two decades in Canada have not, in general, reflected these aims. Two of the more important results (unexpected) of the quota and EA policies in addition to the failure to protect the groundfish resources from overfishing include: an expanded and active role of the state in the fishery (instead of a reduced neutral role) and an increase in competitive illegal fishing activities between fishery participants which was undermining the fishery management objectives (instead of eliminating destructive competition between fleet sectors and encouraging more orderly

²³ The concerns arose when it became apparent to the other fishery interests that the large companies could freely and openly buy and sell (permanently transfer) their fish allocations between themselves regardless of the affects on traditional user groups, fishing industry patterns and dependent communities. Given the potential negative impacts that permanent transfers of EAs would have on employment and community structures throughout Atlantic Canada the federal government was publicly forced to place conditions on EAs and place minimal restrictions on indiscriminate transfers of EAs. The EA proponents (theorists and company owners), however, argued that this political wavering undermines the intent and goals that the policy was trying to achieve for the fishery.

fishing).

D. Quota and Enterprise Allocation Practices: Unexpected results

Although prevention of over-fishing as well as the elimination of destructive competition and the reduction of the role of the state in fishing industry activities were promoted for the exclusive quota/EA (output) policies, the results for Canada's groundfish fisheries do not indicate that this is the case. The process of imposing quotas and later EAs on the fishing fleet sectors over the past two decades has, in reality had a number of unexpected results and these results are opposite to what the orthodox theories have promoted.

One unexpected result, after some initial successes in the late 1970s, has been continued over-fishing of the Atlantic groundfish resources. The quota and EA system in Canada has not been able to contain and limit over-fishing. For example, for the important groundfish fisheries off the coasts of Nova Scotia, the DFO/Groundfish Industry Capacity Advisory Committee, after studying the status of the stocks reported that

heavy fishing pressure has helped to deplete Scotian Shelf groundfish stocks throughout the 1980s. Total allocations for cod, haddock, redfish, flounder, and pollock dropped from 279,750 tonnes in 1982 to 172,440 tonnes in 1989 - a more than one-third decline. Strict conservation quotas and stringent regulations have failed to control fully the fleet's excessive fishing power. Fishermen have continued to invest in bigger and bigger boats. By depleting traditional stocks and preventing potential growth, overfishing has cost fishermen millions of dollars (DFO, 1987:2).

The overfishing activities have taken the form of participants misusing the catch quotas and EAs by misreporting, discarding, dumping and highgrading and these types of activities are now inherent to all fleet sectors fishing the groundfish resources. In response, DFO has had to place activity restrictions on individual fisherman's licenses (conditions of licence) in order to control the number of trips and amount of fish that vessels can take at any one time.²⁴ For example on the Scotian shelf fisheries (NAFO Divisions 4VW, 4X, and Subarea 5), before any fishing begins, license conditions must be issued to individual vessel owners for each trip they undertake (See Appendix D). Licence conditions are issued by a Fishery officer and signed for by the fishermen or owner of the vessel. The licence must be on-board the vessel for the duration of the fishing trip and it states exactly the amount of fish that can be caught, the areas where fishing can take place and the period of time when fishing can occur. Therefore one can see that the quota system has not diminished the competitive drive to overfish the resources, but rather has increased the efforts of fishermen to avoid quota restrictions. This response, which is now endemic to the groundfishery is essentially the same characteristic phenomenon that has been the focal fishery problematic since fishery management began to be studied in the last half of the 19th century.

²⁴Because of the reports of offshore vessels abusing the quota/EA management system, operators must now notify DFO on a daily basis when and where they will be landing catches. This procedure has greatly increased the involvement and costs to the state for monitoring vessel activities and ensuring compliance to regulations.

Another result has been that as the quota and enterprise allocation policies are refined and modified over time in response to the illegal activities, they have become increasingly complex and administratively cumbersome.²⁵ For example, when a quota for a species of fish is caught and closed to directed fishing, fishermen are allowed to redirect their fishing effort to other species. Because of the problems of by-catches in multi-species fisheries fishermen are allowed to keep specified amounts of so-called incidental catches of the closed fishery species (i.e. 10 percent by weight of the total catch onboard). This regulatory policy, while initially addressing a typical fishing operational problem, has in practice changed the behaviour of fishermen and the traditional fishing activity patterns. Now fishermen catching more fish than they are allowed, have to make a choice. They can cheat by altering their catch logs in order to meet the regulatory requirements or dump the fish (which is also illegal) and lose potential money. Many fishermen catching large amounts of incidental catches in the groundfish fisheries now routinely choose to either mis-report their excess illegal catch landings or dump the excess fish at sea in order to meet the harvesting restrictions.

Therefore despite the fact that Canada has imposed both non-exclusive and exclusive policies, in the groundfish fisheries, the results have not been what the promoters anticipated. For example, overfishing of the fishery resources continues and illegal fishing activities are

²⁵The Nielson Task Force Report on Fisheries (1986:29) reported that since declaration of Canada's EEZ that DFO in trying to meet the conservation and socio-economic objectives had "put in place a myriad of regulations aimed at allocating stock by geographic sectors, boat sizes and gear types. The operation of this regulatory system in 1984 required 2,882 PYs and cost \$236 million."

increasing, instead of the fishing activities becoming more orderly, less competitive and destructive on the fish stocks.

Another important unexpected result of the quota and EA policies in Canada has been the expanding and active role of the state in the groundfishery (rather than a reduced neutral role as orthodox proponents predicted). Since the early 1970s the Canadian state has been assuming a larger and essential role in managing the Atlantic groundfish fishery resources. Examples of the increasing role of the state in the groundfish fisheries can be seen in the number of consultation meetings undertaken (meetings with industry and the provinces to establish allocations and regulatory control measures), the increased regulation of fishing activities (including monitoring, control and surveillance), and the increased infusion of public funds to support the fishing industry over the years (1974 Temporary Assistance Program (TAP), 1977 Atlantic Development Review, 1982 Kirby Task Force, 1987 Capacity Committee, 1989 the Northern Cod and Scotia Fundy Task Forces).

The consultation meetings for developing the Atlantic groundfish management plans has grown exponentially since 1973. For example, in 1977, the Atlantic Groundfish Advisory Committee (AGAC) met 4 times to discuss the development of an Atlantic wide management plan. By 1988, AGAC, as well as the four additional Regional Groundfish Advisory Committees, comprised of over 35 industry interest groups and provincial government representatives held over 100 government sponsored meetings to discuss the development of the AGMP. For the Bay of Fundy and Scotia shelf groundfish resources alone, the Scotia Fundy Groundfish Advisory Committee and two Area Groundfish Advisory sub-Committees for southwest Nova Scotia,

southwest New Brunswick and eastern Nova Scotia held over 70 DFO supported closed meetings. Each of these committees consist of memberships who represent over 25 different fishermen/industry interest groups or affiliations. In addition to the meetings of AGAC, the Regional Groundfish Advisory Committees and Area sub-committees, consultations are regularly undertaken throughout the year with provincial governments through a Deputy Minister's Committee and the Federal/Provincial Ministers Fisheries Committee.

With respect to the continual infusion of public support funds into the fishing industry over the years and especially to the dominant company sector many examples are readily available. Even Gordon Cummings, NSP admitted to the Senate of the Whole on February 17, 1987 that

In the 1982-1984 period, when there certainly were difficulties in the Atlantic fisheries, we understand and realize, as do you, that over \$100 million of Canadian funds was infused by the Government of Canada into several companies in Atlantic Canada (Senate Debates, February 17, 1989:536).

It is ironic that over the past two decades, as Canada has imposed more and more exclusive management policies (limited entry and quotas/EAs) it has had to maintain the traditional non-exclusive policies (closed seasons, gear restrictions, area closures, fish size limits, etc.) that they were supposed to replace as quotas/EAs gradually rationalized the industry. As well, instead of controlling over-fishing activity, reducing the role of the state and eliminating destructive competition between participants, the problems have actually increased, as is readily apparent on an almost daily basis in the news media. The state has expanded it's role and become more involved in the affairs of the industry. Instead of eliminating or decreasing destructive competition between fishery

participants and creating the conditions for orderly fishing , the policies have increased competition between participants since they began being imposed over twenty years ago. Illegal fishing activity has also been increasing. And the fishery management response to all of these unexpected results has been to almost continually refine the non-exclusive control measures and further revise and modify the exclusive policies advocated by orthodox theory proponents. This ongoing orthodox approach to control over-fishing and create a viable stable groundfish fishing industry in Atlantic Canada continues up to the present.

3. Policy in Practice: Groundfish Management in United States²⁸

A. Policy: The Northeast Fishery Management Plan

As we saw in Chapter 3, the United States fishery management policy development process is legislated. This has resulted in much less discretion and flexibility for the state to impose the exclusive restrictive management control policies (limited entry and quotas/EAs)

²⁸Information on the New England groundfish fisheries management practices was gained in my discussions with Douglas G. Marshal, Executive Director, New England Fishery Management Council, Saugus, MA., Susan Peterson, David Tierkla and Peter Doeringer, Boston University, Boston, MA. and the Northeast New England Fisheries NMFS staff; Richard Rowe, Regional Director, NMFS Gloucester MA., Dave Crestin, State Fisheries co-ordinator and Frank Gaice, Senior Staff Officer, Sea Grant Co-ordinator.

called for by orthodox perspective proponents, as is the case in Canada.²⁷ Because policies are developed openly in public forums, the process of imposing restrictive measures on the groundfish fishery is complex and intricate. Unlike Canada, the process is conducted over multi-year periods and any changes to existing policy can (and does) take several years before becoming operationally incorporated into Fishery Management Plans (FMPs).

As noted earlier, the management of the groundfish fisheries in the United States prior to 1976 was similar to Canada's management approach and rooted in their joint experiences as members of ICNAF. Both approaches focused on reducing fishing effort and rebuilding depleted groundfish resources and both were firmly based on an orthodox understanding of fishery problems and solutions (Pontecorvo, 1974). However, because of the different political, economic and cultural contexts from which the fisheries are conducted and managed in each country, the approaches began to diverge dramatically after 1977. Canada moved towards greater application of exclusive management prescriptions to fishery problems (limited entry and quotas/EAs). The United States on the other hand, was forced by particular political considerations to reject exclusive policies and adopt a more laissez faire or free enterprise approach for managing its groundfish fisheries (Pontecorvo, 1977). This approach rejected the need to control the fishing fleet

²⁷Limited entry is one way of regulating the amount of fishing effort by restricting the number of available fishing licences and therefore the number of fishermen. Because of the social, cultural and economic consequences of denying access to a fishery to those without licences, the U.S. industry has opposed such policies.

through limited entry and quota management policies (Peterson and Tierkla, 1987:31). The United States approach involves a minimum of regulation (using non-exclusive control policies such as closed seasons, fish sizes, gear restrictions etc.) and a maximum amount of public participation.

The policy framework for developing FMPs (in effect for multi-year periods) plans for meetings to be conducted over a several year span. The FMP describes the processes by which each fishery will be managed, including the limits of any proposed regulatory changes being considered. Pre-season and in-season adjustments of FMP regulations cannot be made without a formal FMP amendment proposal and only by following the established procedures set in the FMP policy framework. How has the U.S. groundfish management approach worked in practice?

B. Practice: The Northeast Fishery Management Plan

Since the FMCA,1976 legislation was implemented, the benefits anticipated for the U.S. groundfish fishery management approach have not been realized.²⁸ In fact it is generally understood that the United States has failed to meet it's primary national objective as set out in legislation, which is the protection of the marine resources from over-fishing.²⁹ Why?

²⁸ During the development of the FMCA,1976 legislation and continuing up to the present orthodox theory proponents in United States have been generally outraged at what is seen as the failure of the state to implement policies that would restrict access to the fisheries and thereby encourage increased rationality and efficiency in the fishing industry.

²⁹The primary objective of U.S. fishery management is to conserve the stocks and ensure adequate use by the public of the available resources.

The first U.S. FMP for groundfish was implemented on March 14, 1977. The federal government imposed the FMP under emergency federal legislation because the full fisheries management system legislated by the FMCA, 1976 was not fully staffed and functioning.³⁰ Almost immediately problems were encountered which over the years have greatly affected the practice for managing the U.S. groundfish fisheries. Because the 1977 harvest catch rates were much higher than anticipated, the quotas set in the emergency FMP were exhausted very early in the fishing year. The FMP was soon subjected to intense political pressure by industry participants who began seeking amendments. The response to this pressure by the newly organized New England Fishery Management Council (NEFMC) was to begin to rely less on the federal NMFS staff and the quota management policies they advocated. At first, the Council began revising the federally imposed emergency groundfish FMP.³¹ During the next three years many such revisions were made to the emergency FMP, resulting in significant increases to the allowable harvest levels (quotas) and relaxation of some of the more stringent fishing control measures. During this initial period the NEFMC had attempted to manage the groundfish fisheries using single species bio-economic fishery management models based on orthodox theory, despite the wishes and concerns of the fishery participants themselves.

³⁰ This initial emergency plan continued the former ICNAF regulatory practices such as limiting catches, setting minimum fish sizes, closing areas to fishing, limiting fishing seasons and restricting fishing gear mesh sizes.

³¹ The New England Regional Council (NERFMC) has the primary responsibility for managing the groundfish resources in the Fishery Management Zone (FMZ) and consists of seventeen voting members from both large and small operators of the processing, commercial and recreational harvesting sectors as well as monitoring representatives from the Coastguard, State Department, Atlantic States Marine Commission and the Mid-Atlantic Fishery Management Council.

However, because the fishery participants had the opportunity to play a direct role in the fishery management decision-making (ensured by the FMCA,1976 legislation), they soon began influencing how the process was to be conducted. This influence was expressed during public council meetings and hearings. The many revisions and amendments to the FMP made after it's initial implementation reflected the participants concerns and desire for significantly increased catch limits. The Council executive themselves, also began having fundamental disagreement with many of the restrictive provisions of the emergency FMP and soon were identifying and in agreement with the concerns of the fishermen and industry participants. However, in spite of this identification and agreement, the Council was forced by the provisions of the emergency FMP and the FMCA,1976 to continue developing restrictive management control measures that abided by formal evaluation requirements which were being monitored by the federal agency NMFS.³² The measures imposed on the fishery participants eventually became so disliked that both the theory which justified them and the federal agencies which required them lost credibility and legitimacy. This was the social, political and cultural context for fishery management policy development during the period 1977-80 as the NERFMC Council attempted to manage the groundfish fisheries for which it had responsibility. The almost universal negative reaction by the fishery participants to the initial emergency FMP had been strong and often quite

³² In 1981, the Fisheries Management Plan proposed by the NERMC (the representatives of the fishermen and industry themselves) was rejected by the federal government because it didn't satisfy conservation requirements of the FMCA,1976. An interim Management Plan was later developed and imposed while a comprehensive Multi-species FMP was being developed.

bitter. The collective perception of the participants was that the orthodox based control measures, however much they were diluted by subsequent lobbying activities, were too restrictive and not appropriate. The control measures were criticized for not being sensitive to their traditional rights of access to the fishery and individual freedoms. This criticism in turn formed the basis for fishery participants rationalizing and justifying illegal fishing activities and non-compliance with the provisions of the FMP.³³ Out of frustration with the FMP's restrictions many fishermen regularly discarded small fish, landed fish in excess of set quotas without reporting them, and misrepresented their landed catches. Fishermen also used prohibited fishing gear which in turn destroyed potential future harvests. Misreporting became serious and resulted in accurate scientific analysis of the stocks becoming next to impossible. By mid-1980s the United States groundfish fisheries were in serious crisis and the FMP had failed to conserve the stocks. In discussing the failure of the United States management approach Peterson and Tierkla (1987:32) write that

The reasons for this are myriad, and fault can be found in the cumbersome structure of the management system, the actions and reactions of competing industry segments, and in the adversarial role which has evolved between NMFS and the Council. The Council system, combined with incredible diversity in the harvesting sector, ensures lowest common denominator management.

³³ It is interesting to note that orthodox theory offers no guidance or alternatives to differing circumstances and realities of a fishery. In fact the very failure of orthodox policies are often used by proponents as examples of the behaviour of fishermen as being considered irrational and their activities inevitable directed at destroying the resources.

For fishery participants the reality at the time the FMCA, 1976 was passed was that with indications of improved fish stock availability and the removal of foreign harvesting competition, they should be freer to operate rather than having more restrictions placed on their operations.

The disastrous results of the initial U.S. groundfish management policies and practices in the years after the implementation of the Extended Fisheries Jurisdiction, 1977-1981, resulted in the FMP and regulatory control measures being re-examined. Of the many problems in the United States FMP development amendment process, the key problem is clearly the inability to reflect the current biological status of the fish stocks in the provisions making necessary in-season adjustments on a timely basis. After the failure of the emergency FMP in 1981, an interim FMP was imposed while a new comprehensive FMP was developed. By 1985 the "optimum yield" objective for U.S. fisheries management was under review by the National Oceanic and Atmospheric Agency (NOAA) to determine it's continued appropriateness. In 1987, a new Northeast multi-species FMP was implemented. However, in spite of the learned experiences gained under the emergency FMP, the interim FMP, the NOAA's review of the optimum yield objective, and the eventual implementation of the Multi-species FMP, U.S. groundfish resources continue to be over-fished and adequate fishery management policies are not being undertaken (NOAA, 1985; NEFMC, 1985 and 1988).³⁴

³⁴ In order to understand the relationship of organizations to each other in the U.S. system, one must know that the federal fisheries management is the responsibility of the Department of Commerce (DOC). Within the Commerce Department, the NOAA houses the National Marine Fisheries Service (NMFS) which is the federal organization concerned with the individual state conservation agencies, the recreational interests, the fishing industry, and general public. NMFS is responsible for planning, organising, and implementing fishery management

4. Conclusion

After the decline of ICNAF in 1976, major policy and practice differences between Canada and United States fisheries management systems arose as the theoretical objectives of orthodox theory began to be concretized. The fishery management objectives of each country are essentially the same and are drawn from the same orthodox theory understandings of the fishery. However, the formal systems, policy and practices differ significantly. It was when the two countries began focusing their policies towards the achievement of specific fishery management objectives that differences began to arise. In this chapter differences between the policy and practices for managing the groundfish fisheries have been identified. Also the chapter illustrates the differences between the rhetoric of orthodox theory and the practices when it is translated into policy. The theory is not able to anticipate the outcome of policy put into practice since the theory ignores the political, economic and cultural context within which any practice is embodied.

Depending on the particular political economic and cultural context, the acceptance and compliance to fisheries management policies and control measures by the fishery participants varies greatly. In Canada the federal government historically has been able to assume and exert considerable management control over the groundfish fisheries and this control has

plans, providing fishery development services (commercial and recreational) and administrative support to regional fishery management councils.

increased especially after 1977. In United States after 1976, the federal state intended to manage and control it's fishery resources by using the control measures prescribed by the orthodox theories, but it was eventually thwarted by the industry participants themselves.

The orthodox theory of fishery management with its limited definition of the problems and solutions of the fishery is formulated at an abstract level and so fails to address the realities of a particular fishery. Orthodox theorists believe that theory can apply in any fishery with little modification (for example Gates and Norton, 1974). That is, the theory ignores the fact that fisheries have different biological characteristics, as well as different histories, different political economies and different cultural concerns. The reality is that as orthodox theory's objectives are translated into practice, there is resistance by the participants. This resistance takes the form of efforts to modify the management systems, policies and practices. These elements are shaped by the unique social conditions within which they are placed. Orthodox theorists continually argue that the theory would work if less emphasis was put on the political, economic and cultural aspects of the fishery and more on the strictly economic aspects. This chapter has shown the opposite to be the case: that in applying abstract orthodox theory to concrete situations the history, experience, interests, and conditions of the fishery participant's lives cannot be ignored.

The next chapter assesses the strengths and weaknesses of research work that uses an alternate paradigm to that of the orthodox paradigm. This alternative paradigm focuses on the interrelationship of the political and economic factors of the fishery. The aim is to see if a

political economy perspective to fishery problems brings us closer than the orthodox perspective in understanding the issues for effectively managing the fisheries.

CHAPTER SIX
Political Economy and the Role of the State
in the Fishery

1. Introduction

This Chapter examines how fisheries problems are posed from an alternative paradigm to that of the orthodox paradigm. This alternative paradigm does not view society as functionally and harmoniously integrated. It assumes instead that society is based on inequality and contradiction resulting from this inequality. Social change occurs as a result of people striving to solve contradictions in their own interest. Within this alternative paradigm, research is not neutral and objective, rather it is aimed at producing knowledge which will help create a more equitable society. The political economy perspective falls within this alternative paradigm.

The political economy approach takes a very different stance from the orthodox bio-economic approach in understanding fisheries problems. While orthodox proponents concern themselves with the process of modernization underway in the fisheries, defined solely in terms of increasing firm efficiency and extracting maximum monetary benefits from common property, the political economists concern themselves in historical terms with productive relations and the nature of the economic process. Specifically, political economists seek explanations for problems in the fisheries by examining the structure and organization of the fishing

industry, the dynamics of group relations (the distribution of power) and the role of the state in the fisheries.

2. Structure and organization of fishing industry

The orthodox approach generally ignores the structure and organization of the fisheries in their analysis. They make the assumption that as long as modernizing firms are allowed to freely compete and become as efficient as possible, the unencumbered marketplace will facilitate the creation of appropriate structures and organizations to ensure rational exploitation. Political economists, however, argue that examining the existing structure and organization of industry is necessary if one is to understand fisheries problems. This understanding is important for analyzing the concrete practices of participants and related interests in the fishery as well as the processes underway within the fishing industry (Barrett, 1979, 1980, 1981; Barrett and Davis, 1983; Barrett and Apostle, 1987a, 1987b; Williams, 1979, 1985; Clement, 1986, 1984, 1989; Sinclair, 1985; Fairley, 1985).

The fishing industry is structurally and organizationally very complex. It involves harvesting operations, as well as processing, transportation, and marketing activities. The fishing industry also defines the social and economic life of fishing communities.

Staples theorists were the first to consider the structure and organization of the fisheries from a political economy perspective. Their concern was to understand the processes involved in natural resource

exploitation (Clement, 1989).¹ For staple theorists like Harold Innis (1954), the characteristics of natural resources determined the structure and organization of the exploitation process.² That is characteristics of particular resources define how those resources will be exploited and provide the basis for the social and economic relations underlying exploitation processes. Furthermore Innis argued that the development of staple resources (and especially the fishery) has been determined and directed by outside market forces (Clement, 1989:108). Clement (1989) points out that staple theorists were also concerned about the uneven distribution of benefits from the resources. That is benefits were seen to be distributed unequally between core areas and marginal areas.

Present day political economists focus not only on resource characteristics as important in the formation of the structure and organization of fisheries, but also incorporate the concept of property relations into their analysis (Clement (1984:9)).³ They argue that an understanding of the capital and labour processes of fish harvesting, processing, marketing, and financing arrangements requires an understanding of property relations.

Political economists explain that much of the controversy in the fisheries is the result of changes in the industry's structure and in the

¹ This discussion of staple theory draws mainly on Clement's (1989) discussion in *The Challenge of Class Analysis*. Ottawa: Carleton University Press.

² Other important fishery researchers in the staples school include Ruth Fulton Grant (1934) and W.A. Carrothers (1941).

³ Clement (1984:6) defines property relations as "a set of rights or enforceable claims which order relations among people and between people and things."

property relations that are underway within the entire industry and wider economy. As fishing has industrialized, drastic changes in the relations of production of the fisheries have occurred. Merchant capitalists of the saltfish trade have been replaced by the industrial capitalists of the fresh/frozen/canning processing industry as the dominant organizational form, and as a result fishermen have been changing from simple commodity producers to industrial workers (Barrett, 1976; Clement, 1986; Ommer, 1985).⁴

Contemporary political economists writing within a Marxist framework understand the present day structural and organizational forms of the fishing industry to be modelled on capitalist relations of production.⁵ Clement (1986:191) writes that in Canada the fisheries "are not highly individualistic 'vestiges' engaging in free market relations (but rather) most fishing is socialized labour and most fishers participate in an industrial capitalist economy." It is, these dominant capital relations of production, Clement argues, that by the mid 1970s had replaced the merchant/fishermen relationships with corporate/organized labour relationships.

In Atlantic Canada the motivating force behind the dominant industrial fishing interests is the need of large capital to continually grow and expand its productive capacity. For example, the larger

⁴ Rosemary Ommer's (1985) work in Newfoundland stresses the importance of organization of the fisheries. For example the 19th century merchants had organized the institutions of fishing in a way that development of the resources had been stalled. In addition the Newfoundland state failed to provide an appropriate development strategy to overcome these organizational blockages.

⁵ That is not to say that these fisheries do not at the same time consist of various degrees or remnants of merchant capitalism depending on the particular situation and stages of development (see Barrett, 1976, 1979, 1981; Clement, 1989, 1986, 1984).

processors have concentrated on fresh/frozen fish markets which require a year round and continuous supply. In order to supply this market, they have increased their share of the available fishery resources by introducing and using more capitalized equipment and labour processes in their operations. Company ownership of vessels has become the dominant organizational form in the fisheries especially after the introduction of steel stern trawlers that operate year round in the North Atlantic fisheries (Barrett, 1976, Clement, 1984).

Barrett and Apostle (1987b) have been intensively studying the structure of the Nova Scotia fishery. In one study they found that the Nova Scotia fisheries are largely seasonal and labour intensive, not just because of the natural characteristics of the resource, but also because this suits the needs of capital. In their study Barrett and Apostle address the nature of the interaction between capital and labour in terms of industrial structure, location, and labour process. They determined that the structure of the industry is directly related to levels of capitalization and that the levels of capitalization depend not only on the availability of state subsidies and market conditions, but also on the availability of appropriate labour markets.

In another study of boat captains in the Nova Scotia fishery, Barrett and Apostle (1987a) examined the organizational context of the harvesting sectors of the industry. They concluded that "the offshore fleet over 95' is a distinctive entity defined by its integration at formal and informal levels into the onshore processing sector" (Barrett and Apostle, 1987a;30). The inshore fleet on the other hand was not definable in the same way. They found the inshore "is highly

differentiated by scale, technology, enterprise-level social relations, location, and the nature of vertical ties to the processor sector" (Barrett and Apostle, 1987a:30-31). Since large social differences exist within this part of the harvesting sector, they conclude that understanding the complexities that result from these differences is essential if capital/labour interactions are to be understood organizationally.

3. The dynamics of group relations (distribution of power)

Explaining the dynamics of group relations (including conflict) in the fisheries is considered in different ways by orthodox proponents and political economists. The orthodox approach focuses on the interaction of fishermen with the available resources. Fishermen, it is argued, are motivated by individual self-interest to increasingly exploit common property fisheries to extinction or levels where participants are forced into economic poverty. For political economists, however, the focus is on explaining the problems of the fisheries in terms of conflicts between competing interest groups who have unequal amounts of power (power includes the ability to control and influence fisheries management decisions). This focus enables political economists to identify the dimensions of conflict, specify those who exert the most power and show the relations of dependence that exist in the fishery.

Clement explains the pervasive conflict that exists in the fishery in terms of the exercise of power. He points out that struggles over power can be analyzed as different dimensions of society. For example he writes

that

struggles over the benefits or use of property rights constitute the political dimension; the justification of their interests by those controlling or those excluded from property rights constitutes the ideological dimension; the history of local/regional attitudes, traditions, and practices constitutes the cultural dimension" (Clement, 1986:68).⁹

Since the industrialization of the fisheries, the capital interests have become the dominant group participating in the fisheries. Barrett (1981) writes that up until 1976 the political economy of fisheries have reflected the changing short-term interests of all forms of capital. As a result producers and workers have formed many distinct forms of organizations to represent themselves and protect their interests in struggles with capital over the years. For example, between 1900-1930, Barrett (1976) classifies the Nova Scotia fishing labour into four categories; wage plant workers, inshore fishers, schooner fishers, and trawler crews. He shows how these labour categories formed and transformed their organizations over time and used particular strategies in their struggles with the various dominating forms of mercantile and industrial capital. For the period after 1976, Barrett (1981) feels that the large

⁹ Political economists take the view that the fisheries are inherently political, and so the only way to really understand them is to analyze the social political and economic relations of power and dependence within them. Clement (1984:6) argues that these relations in the fisheries are based on class relations, and these class relations underlie the structural and organizational formations of the fishery. The more powerful or dominant fishing interests, it is argued, gain not only the largest share of benefits from the available resources but also receive the largest share of incentives and support from managing authorities. It is the exercise of this power for individual or interest group gain that explains the conflict between groups that is so prevalent in fisheries throughout the industry. Political economists are specifically concerned with how those who have the controlling power over benefits from the fisheries have used it to affect the form of benefit distribution (Clow, 1984).

scale capital sector has come to exert the dominant power over the fisheries although many forms of small scale and merchant dependent relationships still persist in the fisheries.

For example in their analysis of the Canadian east coast fisheries, Political economists [Barrett (1976, 1981), Williams (1979), Barrett and Davis (1983), Sinclair (1984), Barrett and Apostle (1987a, 1987b)] have shown how large scale capital has dominated not only the decision making process of the state, but also the pricing and marketing arrangements of the entire industry. As Williams (1979:179) puts it "the issue of price (paid for fish) should never be separated from problems of control and structure in the industry".

As already noted, in order to increase their influence and power, fishermen have formed many types of organizations to represent and protect their interests. In the same way capital has used their power to control producers and workers by having state supported legal barriers erected to hinder to organization efforts (especially unionization) within the fisheries sector (Clement, 1984). For example the imposition of co-adventure status for trawler crews, legislation in the form of anti-combines law, and the creation of jurisdiction impediments (both federal and provincial) have restricted the ability of individual fishermen to organize effectively and increase their influence in the fishery.

Clement (1988) observes that even though processors (capital) are well organized and much more powerful than are fishermen, they themselves are part of a chain of dependence (as well see Marchack, Guppy and McMullan, 1987). He explains that British Columbia Packers on the west coast of Canada is owned by the giant American food firm George Weston,

and that the major Canadian east coast fish processors are either owned, controlled, or supported by banks, governments and highly concentrated export market interests. In the same way that small processors are dependent on larger processors for markets, the larger processors are also dependent through financial and marketing arrangements with even larger capital interests.

At the other end of the dependence continuum (for example at the community and family level), an unequal distribution of power exists for many of those who depend on and labour within the local fishing industry. Connelly and MacDonald (1983) have researched household employment patterns in Nova Scotia fishing communities and concluded that within the fishing industry women have the least amount of power and control over their situation, they bear the heaviest burden of work, (often doing both domestic and wage work), and they receive the smallest share of benefits in the form of wages and status.

4. The role of the "state" in fisheries

Orthodox proponents assume that the role of the state in the harvesting, production, and management of fishery resources is neutral. Political economists disagree and point out that the state exerts enormous influence and control over the entire fishing industry and management process (Barrett, 1981; Barrett and Davis, 1983; Sinclair, 1985; Williams, 1985; Connelly and MacDonald, 1986; Barrett and Apostle, 1987).

One of the key premises used by the political economist is an understanding or theory of the state that points out that the state does

not function neutrally in society. Barrett (1981:1) argues that "In any particular historical epoch, the major function of the state is to exercise hegemony in the interests of the capitalist class as a whole. Such intervention is often simply to impose conformity, especially in intra-capitalist tensions, although the coercive apparatus is available to enforce hegemony should it be necessary."

Williams (1985:18) points out that in the literature the treatment of the state's role in the fisheries and the understanding of policy making and management processes have not been addressed adequately.⁷ In fact Barrett and Davis (1983:1) write that

The Atlantic Canadian fisheries may contain the most systematic and profound relationships between the state and the corporate sector in this nation's history.

In Nova Scotia fisheries, Barrett (1981:1) identified three distinct policy periods in which the state has played an important role in the fisheries on behalf of the capital interests. These periods include; a regulatory phase between 1930-39, a laissez-faire phase between WWII-1973, and a renewed regulatory phase from 1974 to the present. He concluded that the state fisheries policies during these periods were complimentary with and supportive of the growth and development of large scale fishing capital. With respect to the confluence of interests between large scale capital enterprises and state agencies, Barrett's work provides some important insights. Using a history of the origins and growth of National Sea Products (NSP) into a large multinational company, Barrett shows how the state has supported the restructuring and consolidation of small scale

⁷ Some of the work completed to date includes Barrett, 1981, 1983; Barrett and Davis, 1983; Sinclair, 1985; Williams, 1985).

capital into a large fishing monopoly (especially in the post WWII modernization period).

Similarly, Sinclair (1985:6; 1984:8-16) reviewed state policies in Newfoundland dragger fisheries and found three different categories of support to the interests of capital. These include direct income support, direct capital investment support, and resource management support (i.e. limited entry). He determined that state fishery managers operate in the interests of both small and large scale capital over other fishing interests, but not consistently in favour of one over the other.

Barrett (1981) feels that since capital interests are for a more rationalized, capital intensive, vertically integrated fishery (as a way to improve cost efficiencies), the state has played an important role in helping transform the industry in terms of those interests. For example, during the regulatory phase 1930-1939, Barrett acknowledges that while state imposed restrictions on the use of trawlers benefited many individual fishermen, they in fact were implemented largely in the interests of small Southwest Nova Scotia capital. Later, during what he terms the laissez-faire phase 1945-1973, because of perceived deficiencies, the fisheries were subject to an unregulated industrial expansion which transformed them. The state supported this industrialization process by removing restrictive harvesting regulations on trawlers and subsidized the process of modernization in the fisheries. The state subsidization of capital accumulation in support of the modernization process during this period was based on the orthodox management prescriptions called for by bio-economic theory and neo-classical economics. Barrett characterized the 1950s and 1960s as the

"golden age of modernization" when both the federal and provincial governments fully agreed on how to address the problems of the fisheries (Barrett, 1981:16).⁹ He showed how the provincial Department of Fisheries, the Atlantic Development Board, and Atlantic Provinces Economic Council (APEC) and federal government all called for and co ordinated their support for the modernization process in the Atlantic Canada and how this resulted in the growth and increased domination of the industry by large fishing monopolies such as National Sea Products (Barrett, 1981:19).⁹

Finally, the renewed regulatory phase from 1974 to the present represents the interests of large scale capital over small scale capital, in their need to control the sources of fish for their operations. The state has met this need by supporting the establishment and growth of vertically integrated firms which can control all aspects of the production process. Even though the state has been well aware of the problems of vertical integration in the fishery such as the ability to control prices in the market, to the disadvantage of smaller producers and processors, the support of such enterprises continues up to the present.¹⁰

⁹ Barrett (1981:17) points out the role that the scientific research section of the federal fisheries department (Fisheries Research Board of Canada) has played in support of the interests of capital. They provided funding and published the research of H. S. Gordon (1953) which resulted in his well referenced orthodox formulation of the fishery problem "An economic approach to the optimum utilization of fishery resources."

⁹ Barrett categorizes the modernization period into two phases. The first phase was the criticisms of traditional fishing methods of the 1950s and second was the concern for the competitiveness of the fishing effort.

¹⁰ Lower overall port prices emerged from the fact that (a)n integrated company getting most of its fish from its own fleet is likely to be concerned with the total landed cost of fish than with the price for fish in the port market. The latter price, which is usually is set by the leadership of the

The use and application of the common property concept illustrates the most important difference between orthodox and political economy approaches to fishery management policy and in whose interest that policy serves. Modern day orthodox theorists now view the fisheries as a common property which must be transformed into private property if problems are to be resolved. This results in orthodox policy prescriptions that call for changes in peoples traditional cultural values and relationships to the fishery. These policies (in the form of restrictions and exclusions on resource accessibility) are deemed necessary in order for fisheries to be modernized (that is overcome their economic backwardness by achieving modern industrial efficiency and profitably). However when these policies are imposed, they often have dramatic and painful consequences for those individuals and communities who most depend on the resources for their livelihood and well-being (Alexander,1977; Sinclair,1987; Connelly and Macdonald,1983). The orthodox approach argues that these social costs and dislocations are necessary for the long term benefit of the fishery and the society.¹¹

On the other hand, political economists argue that the fisheries have never really been a "common property" in the sense defined by the orthodox approach. They argue that the common property concept has never been an historically appropriate description of commercial fisheries, that

integrated firms themselves, assumes for them the character of an internal transfer price (McCracken and Macdonald,1976).

¹¹ As a result, political economists argue that changes in the fisheries should reflect and enhance the core values of individuals and their communities, and should ensure that the benefits from the fishery are distributed equitably and used in a manner consistent with those values.

privatizing the fishery resource and giving it to corporations or individuals will not ensure their protection, and that fisheries underdevelopment (economic poverty and dependence) has not been the result of its common property or open access nature.

Clement (1986:71) argues that "The notion that the fisheries are a common property resource is wrong-headed and historically questionable." He points out that even the commercial fisheries in pre-industrial society were conducted within a restrictive mercantile political and economic context. During the mercantile period, Clement writes that major commercial fishing activities were conducted under protective and exclusive fishing charters or entitlements issued to trading companies in return for royalty payments by imperial states. This means that contrary to the orthodox notion that the fisheries are common property equally accessible to everyone, the fisheries in fact, have always been subject to public access restrictions. For example, Clement makes the point that the commercial fisheries have always been subject to forms of regulated entry. That is since they are only available to those with the means to capture them, access control was enforced through structural and power relationships. When the cost of entry was low, merchants were able to dominate participants by controlling access to markets and supplies. Later as the cost of entry increased with the use of more expensive technology, the processors dominate labour by instituting lay arrangements and controlling the port market price of landed fish. Local fishing communities have regulated their use of resources by means of local customs, rights, and labour arrangements (for example arrangements for sharing; the harvesting, curing/processing of the catch, equipment and

labour, lotteries for stage and trap locations). When fishermen began to emerge from traditional forms of mercantile domination with the introduction of new technologies, they began exerting their individual resource access rights. As a result, the state began transforming the fisheries in the interests of the dominant capital sector from 'open access' to state and private property (first through limited entry schemes and later by quota allocation arrangements).¹²

In contrast to the orthodox prescription for solving the 'common property' problem through the policy of privatizing the resources, the political economists take a much different approach. First, they differentiate harvestable fishery resources into two major analytical categories, traditional subsistence fisheries and commercial fisheries. They point out that different value systems and social relationships to the resources underlie each of these categories.¹³ Political economists

¹² By licensing policies, the state turned traditional access rights into private hands thus creating private property (licences and quotas are essentially owned by individuals, companies and organizations). However, because the large-scale offshore fishery is only one part of the processing companies operations, the marketing mechanisms which are an essential element in the fishery management puzzle remain outside individual fishermen control but under the control of corporations who exert influence (Clement, 1986).

¹³ The orthodox approach takes the view that the values of people are like individual objects, that must be changed periodically if society in general is to advance. That is each person is assumed to have varying amounts of individual potential for success and each person in society should be given an opportunity to realize their potential. The ones that are most successful will rise to the top and assume the leadership roles in society's institutions. Political economists, on the other hand, view the values of people differently. That is the normative values of people are learned through interactions between themselves and their physical and social environment. Positive interactions ensure survival and progress. Therefore political economists argue for values that emphasize and support social skills that encourage positive interactions between people and their environment.

argue that since commercial fisheries have always been controlled by dominant interest groups and are subject to the wider political economy context, the orthodox policy solutions will not work. That is transforming the fisheries into private property, will not erase the fundamental problem, which is the control exerted by the most powerful to the detriment of the less powerful that has always been the key feature of the fisheries. For example, Barrett (1981:23-24), Barrett and Davis (1983:12), Sinclair (1984:20) point out that overfishing continues despite of the implementation of the modernizing policies of orthodox theory. They note that there are many examples that show Canada corporate capital interests have ignored conservationist's warnings in the short run interests of immediate gain and ended up ruining the resources.¹⁴ In Canada, Regier and McCracken (1975) provide examples of herring, redfish, crab, lobster fisheries that also have been overfished and depleted under the same conditions.

Gordon's formulation of the fishery problem (over-harvesting and economic stagnation) is still referenced widely and used as the authority for present day fishery development approaches (despite of the criticisms from just about everyone except neo classical economists for the past thirty years). Political economists reject this understanding of the failure of fisheries to support economic development. For example Williams (1979) argues that the fishery is underdeveloped not because of orthodox common property notions, but because of its distorted structure,

¹⁴ Barrett and Davis (1983:12) have highlighted the fact that in 1976, the federal fisheries officials had determined that the reason for overfishing problems were the result of the activities of the large fishing companies and their trawler fleets. (see Environment Canada, 1976:39)

lack of cohesiveness and overall integration. Barrett's (1981:32) explanation for the inadequacies of the orthodox approach in terms of a blueprint for fisheries development is that the maximum social and economic benefits are not the sum of individual supply curves or user costs. He argues that

The ownership question (for fisheries development) is vitally important in that there is a very substantial difference whether or not one is "rationally" maximizing private interests (profits) or the social interests (Barrett, 1981:33).

Clement (1986:69) raises three important theoretical questions on the continued use of this orthodox concept for fisheries development policies (fishery management policy). First he questions whether common property can be regarded as an absence of rights (i.e. the concept overlooks the claims of the collectively not to be excluded). Second he is concerned about the limits of the common property concept in terms of fisheries analysis. The term assumes that a fishery is a closed system where no other opportunities for labour or economic gain exist, so that fisheries will always be overexploited which does not reflect a realistic situation. Third he points out the failure of the concept to acknowledge the role that social organizations play between the irrational, insatiable individual and the fishery resource. For example the various social/political organizations such as co-operatives, unions, and corporations have been formed with collective interests being considered over the individual interests as assumed by orthodox theory.

Finally Clement (1989:69) argues that the use of common property concept today is really a distortion of Scott's original formulation

which was concerned with capturing the landlord's rent from commercial fisheries. Clement points out the confusion that the common property concept causes when it is used to describe the concrete reality of both the commercial fisheries and subsistence fisheries. The concept, he feels is used simply to justify the imposition of quotas or limited entry on those working in the fishery. Canadian fisheries he argues, are already a state property that has been transformed and parcelled out as private property in the form of licences and quotas to designated users. Therefore, the motivations and actions of fishermen are not irrational (over-fishing resources to depletion), but to the contrary are very rational.

Barrett (1981), Barrett and Davis (1983) and Williams (1985) all saw the 1974 crisis in the Atlantic fisheries as the failure of social, economic and biological policies which were based on orthodox theory. This orthodox theory, they point out resulted in much of the ad hoc, self contradictory and ineffective policies that have been used to manage the fishery to date. They all conclude that until the state assumes ownership of the fisheries the periodic crisis will not only continue but increase in severity, a point that has proved to be quite correct.¹⁵

5. Conclusion

¹⁵ Barrett (1981:34) argues that unless the production and marketing of fish products is assumed by the state, "the age old problems of irrational conflicts, and fragmentation in production and distribution will continue." Williams(1985) "envision[s] a rationally ordered and integrated fishery (and the) need was illustrated four years ago but smoke and mirrors act by the federal government evaded real change. However the crisis continues with higher stakes the next time around."

The welfare economic and maritime anthropological critiques of the 1970s and 1980s, as we saw in Chapter two, argue that neo-classical fishery management theory overlooked important economic and social realities of the fishery. Welfare economists in their critique showed that the traditional definition and application of efficiency, the calculation of net economic benefits and the assumptions underlying marketing processes were simplistic or wrong. Maritime anthropologists in their critique showed that the theory overlooked or misunderstood the behaviour of fishermen, the process of adaptation by fishing communities to resource availability and other alternative over-fishing explanations. Chapter two concludes that although the welfare economists and maritime anthropologists provided an extensive critique of the neo-classical tradition, their criticisms were still formulated within the orthodox paradigm. On occasion their contributions are used to expand and modify neo-classical approaches.¹⁸

This Chapter shows that the political economy approach to fisheries management problems falls within an alternate paradigm. Because it makes different assumptions about the social world, it raises issues and dimensions not considered by either the bio-economic fishery management

¹⁸ Lee Anderson a well known orthodox theorist incorporates a theory of regulation into his latest research and writings on fishery management problems. Because of the difficulty (or work) involved in transposing maritime anthropological contributions (mostly in the form of descriptive explanations) into mathematical variables, very little or no integration between disciplines has been done to date. The most sophisticated strategy employed by neo-classical proponents to deal with the anthropological contribution has been to simply acknowledge this 'other work' and define it as outside of their research problematic.

theorists, or their critics, the welfare economists and maritime anthropologists. Political economists examine the structure and organization of industry, the distribution of power and the role of the state. Chapters 3 and 4 show, these factors are indeed important in influencing and shaping the range of management possibilities and solutions.

Chapter 3 shows that the 'role of the state' in the fishery is not neutral and objective as is assumed in the orthodox literature. Rather the chapter shows that an understanding of the state's role, as the political economists argue, is an important factor in knowing how the fishery is managed, how policies are developed and whose interests are served? For example, Chapter 3 shows that the state in Canada, dominates the fishery management processes and uses extraordinary discretionary power in developing and differentially imposing fisheries management policy on the industry.

Orthodox theories are based on the assumption that all sectors of the fishery are similar in organization and are equal in power. Chapter 4 provides illustrations that show that the structure and organization of the Canadian groundfish fishing industry is not homogeneous and all sectors are not treated equally. Instead the fishing industry is vertically integrated, with a large company sector dominating all the other sectors. Understanding the fishery from a political economy perspective means examining first, the differing amounts of power that sectors have relative to each other and second, how each sector uses it's power to protect and facilitate it's own interests. In Canada, the large company sector has more power than the traditional inshore sector and has

been able to use this power to ensure that it's general interests are met through the policies of the state. For example, as Chapter 4 shows, policies such as EAs, that affected the offshore fisheries were essentially agreed upon in private, closed consultations (negotiations) meetings with the large company sector, while policies such as limited entry, geographic restrictions and quota systems were mostly imposed in the form of government directives on the traditional sectors.

As this Chapter has shown, political economists have made a significant contribution to understanding the fishery and it's management problems. Still there are many questions they have yet to address. For example: what are the implications of implementing decentralized approaches for the fishery; how does the state deal with the practical aspects of day to day fishery management policy and administrative practice; how can traditional community interests be ensured and co-exist with a highly capitalized industrial sector and; how can populist views of the fishery and industry be reconciled with the structural reorganization that political economic critics prescribe as necessary for the fishery?

However, the contribution already made and those still to be made by political economists have been and likely will continue to be ignored by those working within the orthodox paradigm. Unlike criticisms made of theories within a paradigm, it is not considered necessary to take seriously those made from an alternative and competing paradigm. Thus, the orthodox theory problematic, albeit somewhat modified by the liberal critique from within the orthodox paradigm, continues to be the only one "heard" in the field of fishery management research.

CHAPTER SEVEN

Conclusion

In this thesis, I trace the historical development of the dominant fishery management theories from mid 18th century to the present. I determine that these theories have been formulated within a general orthodox paradigm which views society as functionally integrated and social change as evolutionary; it views research as neutral and objective. I show that the theories resulting from this orthodox perspective are in fact not neutral or objective. Instead, they consistently reflect the economic interests of the industrial sector over other sectors in the fishery. These management theories have been and continue to be closely tied to the powerful interests in the fishery, in the same way that the dominant orthodox paradigm is closely tied to the vested interests of society.

Chapter one shows specifically how fishery management theories, the bulk of which have developed from within the disciplines of fishery biology and neo-classical economics, have historically reflected the close relationship between the vested interest concerns of the industrial sector and the development of the theories themselves. It also shows that orthodox based theories are either too simplistic or they misunderstand the problems of the fishery, with the result that management policies are undermined when implemented in practice. That is, policies derived from orthodox theories and implemented by the state do not work as they predict nor do they solve the problems identified.

Chapters 3 and 4 provide concrete evidence showing that despite it's coherent, consistent explanation for fishery problems, the solutions proposed by the orthodox perspective either are not implemented (the United States) or are not working (Canada). By comparing the United States and Canadian fishery management systems, I illustrate the inadequacies of orthodox based theories as they get translated into state policy measures. This comparison shows that despite the similarities in the definition of the problems and proposed solutions for the fishery, the two countries have developed different management systems, neither of which have solved problems. I show that the differences in each country's management systems arise out of their different political, economic and cultural conditions. I explain that by failing to account for these broader conditions, orthodox based theories do not recognize the key factors creating fishery management problems. For example, orthodox theories do not provide any explanation for an understanding of why certain policies cannot be implemented in one country or why they are not working as expected in the other? An understanding of these questions would aid fishery management policy formulation. The orthodox proponents, generally simply argue that the state has failed in some way to fully implement the necessary policy prescriptions. This avoids the orthodox theory proponents having to acknowledge the shortcomings of the theories themselves.

In Chapter 2, I review the liberal critique of the dominant bio-economic theories which began in the 1970s. This critique arose as a result of the generalized fishery management crises occurring in many of the world's fisheries at this time. These crises called into question

the adequacy of the dominating bio-economic theories and increased the concerns of traditional fishery participants and the wider society over the future of fishery resources. Welfare economic and maritime anthropology scholars began to argue that bio-economic theories were either too simplistic or misleading. They pointed out that the dominant theories were based on narrow biological and economic assumptions about; the character of fishery resources, the behaviour of fishermen and the social conditions which support the fishery. I show that despite the criticisms, bio-economic theories continue to dominate and prevail as the most legitimate and acceptable basis for addressing fishery management problems. These theories have retained their hegemony either by modifying or expanding their analytical focus or by ignoring the more fundamental criticisms. I argue that while the criticisms form an important contribution to fishery management theory, they themselves are inadequate because they are essentially rooted in the same general orthodox paradigm for understanding society and therefore, fail to address fundamental fishery problems.

In Chapter 5, I examine an alternate approach for understanding fishery management problems and solutions. I show that the political economy approach is rooted in a different paradigm or perspective for understanding society. The political economy approach shows how the broader political, economic and cultural conditions of the fishery can and do influence the way that fisheries are managed and in whose interests they are managed. While the political economy approach does not directly address policy issues, it does, suggest directions for the development of alternative fisheries management policies.

Before speculating on what political economy fishery policy might look like, I would like to review one orthodox policy response to fishery management failures. This response has been to devise and impose more and increasingly complex control measures on fishery participants. For example, traditional non-exclusive policies such as limitations on fish sizes, closed areas, seasons and fishing gear types are continually being tinkered with and refined in the belief that the problems result from the competitive lawlessness of individual participants rather than the imposition of the measures themselves. In the same way exclusive policies such as limited entry, quotas and EAs are also undergoing constant revision and modification to correct what are perceived to be enforcement problems, not policy problems. The result is even more differentiation between participants and categories of fishermen, vessel classes and quotas/EAs allocations. In Canada, where many orthodox based policies have been implemented, we saw that the number of different licence categories and quotas/EAs allocations has increased dramatically. This has resulted in the fishery participants and fishing sectors becoming even more fragmented and specialized which encourages not discourages competition as participants compete against each other for resource share. Therefore orthodox policies have created more instability not more stability.

Why have state policies been undermined when they are implemented in practice and why do they have a tendency to lead to more state involvement in the fishery not less? The implementation of orthodox policies, as this thesis shows, supports the interests of the dominant sectors over other sectors of the fishery. Because the orthodox theory

approach is founded on the assumption that stability of the fishery depends entirely on the stability of the dominant large company sector, the state policies focus on ways to strengthen and support this sector. However, as we have seen the policy formulation problem for the fishery is actually much more complex in reality and includes cultural and political economic dimensions. Because the orthodox approach either misunderstands or overlooks these complexities, their policy proposals are undermined when translated into practice. The only remaining solution for orthodox proponents is to call for even more involvement of the state to properly manage and regulate the fishery. The orthodox call for even more state coercive involvement in the fishery can therefore be understood as directly related to the failure of their policies in practice.

How can the political economic approach provide a more appropriate basis for undertaking fishery management policy formulation? Unlike the orthodox approach which sees stability of the industry as dependent on the health of the dominant sector, the political economic approach would see stability resulting from all sectors equally sharing the benefits of the resources. The strength of the fishery therefore is in its diversity. All fishery sectors would be analyzed in terms their complexity and their contribution to supporting the diversity of the industry. Rather than optimizing production/cost equations based on equilibrium conditions like orthodoxy promotes, political economy would concentrate on policies that encourage fishermen, fishing industries and their communities to develop the capabilities to contract/expand and absorb the industry fluctuations. In so doing communities would be recognized for their contribution to supporting the fishery, rather than being seen as merely a source of

labour for the industry. Every sector would be examined in terms of its strengths and weaknesses and policies would aim to support the strengths and reduce the weaknesses to ensure fishery stability. While orthodox fishery management policies create the conditions that favour creation of specialized fishing vessels, dominant vertically integrated companies and more coercive state regulation, political economy policies could create the conditions that favour fishery diversity like multi-purpose vessels, decentralized industry structure and more democratic state regulation. These policy possibilities remain to be developed and tested.

To conclude: This thesis shows that orthodox based fishery management theory has failed in the past and will continue to fail in the future to solve the problems of the fishery. It seems clear that a new perspective on fishery management is necessary if fishery problems are ever to be effectively addressed. The political economy approach provides an alternative perspective for analyzing and understanding the problems of the fishery. This alternative approach suggests new research and policy formulation directions which could lead to more effective management systems, more appropriate policy control measures and more equitable sharing of fishery benefits for all participants.

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LIST OF ABBREVIATIONS

- AGAC** Atlantic Groundfish Advisory Committee - Consultative committee consisting of representatives of provincial governments, fishermen's organizations, fishing companies and federal government, scientific and fisheries management officials.
- AGMP** Atlantic Groundfish Management Plan
- By-Catch** The catch of one species when the target species is another. By-catch regulations are set to limit catches of the non-target species for conservation purposes.
- CAFSAC** Canadian Atlantic Fisheries Scientific Advisory Committee is a scientific committee for the generation of advice (stock assessments, research) on all major groundfish species found in the Atlantic Groundfish Management Plan (except NAFO stocks).
- DFO** Department of Fisheries and Oceans Canada
- DOC** United States Department of Commerce
- EEZs** Extended Economic Zones
- EFZJ** Extended Fishery Zone Jurisdiction
- Enterprise Allocation** The allocation of groundfish assigned to an individual company for a particular stock (expressed in weight or percent of a TAC).
- FO.1 level** The level of fishing mortality at which the

increase in yield (marginal yield) by adding one more unit of fishing effort is 10% of the increase in yield by adding the same unit of effort in a lightly exploited stock

FAO United Nations Food and Agriculture Organization

FCZ Fishery Conservation Zone

FMCA, 1976 Fishery Conservation and Management Act, 1976
(Magnuson Act).

FMP Fishery Management Plan

FFAFC Federal-Provincial Atlantic Fisheries Committee -
Intergovernmental committee consisting of deputy
ministers of fisheries for the federal government
and the five Atlantic provinces.

ICES International Council for the Exploration of the
Seas.

ICNAF International Commission of the North Atlantic
Fisheries (1949-1977)

INPHC International North Pacific Halibut Commission

Inshore fleet All mobile and fixed gear (longline,
traps, gillnets, weirs and handlines) less than 100' LOA

LOA Length overall means the horizontal distance
measured between the perpendiculars erected at the
extreme ends of the outside of the main hull of a
vessel.

MSY Maximum Sustainable Yield

MEY Maximum Economic Yield

NAFO Northwest Atlantic Fisheries Organization:
International organization comprised of 18 member nations
which is the governing body for the management of the
fishery resources in the Northwest Atlantic outside of
EEZs.

NEFMC New England Fishery Management Council

NMFS United States National Marine Fisheries Service.

NOAA United States National Oceanic and Atmospheric
Agency

OECD Organization for Economic Co-operation and
Development

Offshore fleet All mobile and fixed gear (longline)
vessels over 100' LOA.

OGAC Offshore Groundfish Advisory Committee (precursor
to AGAC)

Quota Regulated portion of a TAC allocated to a particular
fleet sector.

Regulated Species A species or stock of groundfish which has
an established TAC and quota/allocation.

TAC Total Allowable Catch of a groundfish stock for any
one year.

TAP Temporary Assistance Program, 1974

UNCLOS III Third United Nations Conference on the Law of
the Sea.

APPENDIX A

Policy Formulation in Canada - Groundfish Management

Canada's policies for managing the groundfish fisheries have been relatively consistent since 1976. The policies are implemented each year in the Atlantic Groundfish Management Plan (AGMP). DFO argues that the AGMP's provisions are essentially aimed at conserving and restoring fishery resources, while at the same time providing enough fishing opportunity to ensure the continued economic viability of the fishing industry. The policies are concretized in the form of basic principles and regulatory measures which are clearly drawn from orthodox based theory discussed earlier (DFO, 1980, p.ii-iv).

Each Plan sets out a Total Allowable Catch (TAC) and the allocated quotas and Enterprise Allocations for each of 44 commercial groundfish stocks. The groundfish stocks are exploited at levels that produce over 1,000,000 tonnes landed weight each year in Atlantic Canada. The AGMP development process is controlled exclusively by DFO. The process is conducted in three distinct phases, a scientific phase, a formulation and consultation phase and a regulatory phase.¹

The first or scientific phase is the provision of catch estimates for each commercial stock of fish. A research protocol for providing the

¹ The AGMP preparation process takes place within one calendar year and is operational by January 1 of the following year (DFO, AGMPs 1977-1988).

estimates has been developed and is co-ordinated by a peer review committee of DFO scientists called the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC).² A TAC estimate for each commercial fish stock is forwarded by CAFSAC to senior DFO managers by the fall of each year. These estimates are in the form of recommended numbers which are used to allocate set amounts of fish from each fish stock to the various fleet sectors. CAFSAC researchers calculate their TAC estimates on the basis of scientific stock assessments which are conducted each important commercial fishery. The assessment information is gathered almost exclusively by departmental research and technical staff. The key information gathering activities undertaken by DFO include; sampling the commercial fishery catches, conducting annual research surveys and analyzing the biological production parameters of stocks. The analysis is done using predictive fishery production models that have been developing since the turn of the century (see Chapter 1). The production factors emphasized in present day assessment models include; fish population size/age structure/dynamics, fishing intensity, and to a much lesser extent environmental/ ecological conditions.

² CAFSAC issues a schedule annually of the dates at which required scientific advisory documents must be provided to fisheries managers. Once a CAFSAC schedule has been set individual scientists work on their stock assessment projects during the year to provide the requested biological advice. In the CAFSAC sub-committee meeting research biologists submit their assessment results in the form of a working document. The sub-committee considers the quality of the research and recommends areas that may need future work. When the sub-committee is satisfied, it submits a report to a CAFSAC steering committee which reviews and approves it. A formal advisory document is prepared, but not for release to the public. This document is sent to the Atlantic Director-Generals Committee for review and release. Once the advisory document is released the formal research part of the Atlantic Groundfish Management Plan process ends, unless there are specific problems that have to be investigated further.

The second phase in the development of the annual AGMP involves an industry consultation process. Based on the TAC recommendations of CAFSAC, a committee of senior DFO managers, known as the Atlantic Director-Generals (ADGs) committee prepares the draft fishing Plan. The draft Plan is then forwarded to the Atlantic Groundfish Advisory Committee (AGAC)³ for formal consultations with representatives of resource user groups. It has been DFO's practice to include as members of AGAC, in addition to its own staff, representatives of fishermen organizations, processing companies, provincial governments and in some cases native groups. The draft Plan is presented to the AGAC and consists of the TAC figures for each groundfish stock, quotas assigned or allocated to the various fishery participants (on a fishing fleet sector basis or individual company basis) and the regulatory measures deemed necessary to control the harvesting operations. The provisions of the Plan are debated by the committee and the process finishes when members have expressed themselves at a final meeting held in the late fall of each year.⁴ The

³ It should be noted that for the groundfish species, the Canadian advisory process consists of several levels of advisory committees; regional levels (based on DFO management regions) and an inter-regional level (Atlantic wide based). The regional advisory committees are consulted on those issues that concern only one region in particular. The groundfish management issues that are more general and have implications affecting all regions are addressed at the AGAC committee level.

⁴ Although the formal advisory committee receives the preliminary plan with the understanding that they can modify and finalize details, the actual work is completed by a departmental working group. This working group consists of several federal employees, each of whom represents the interests of their respective Regions and National HQs. The working group resolves, to the extent they can, local, regional and inter-regional problems and present a final draft of the Plan to the Atlantic Groundfish Advisory Committee via the ADGs committee.

Atlantic Director-Generals Committee reviews the draft Plan in light of the AGAC's discussions, then finalizes and forwards it to the Minister of Fisheries and Oceans for approval. Industry interest groups often continue to lobby both senior DFO managers and Minister if they feel their particular interests and concerns have not been addressed during the consultation phase.

The third phase completes the AGMP development process. After the Plan has been approved, regulatory measures for controlling fishing operations are promulgated. As well, monitoring and surveillance strategies are developed by DFO enforcement staff in order to ensure compliance to the AGMP provisions. In addition a small AGAC working group (which consists exclusively of DFO staff) monitors the fishing activities and catches on a daily basis for each fish stock throughout the fishing year. Depending on circumstances, this working group on behalf of the department can and often does make minor changes or adjustments to the AGMP (called fine tuning) for problems not anticipated during the development phases.

APPENDIX B

Groundfish Fishery Management Plan formulation - United States

The U.S. policies for managing its groundfish fisheries formally involve three responsibility jurisdictions. The National Marine Fisheries Service (NMFS), an agency of the Department of Commerce, has the federal responsibility under the FMCA, 1976 authority for preserving fishery resources for the benefit of the nation. Eight Regional Fishery Management Councils have the responsibility for managing the fisheries outside the individual state 3 mile limits on behalf of the federal government. Coastal state governments have the responsibility for managing the fisheries adjacent to their coastlines (Peterson and Tierkla (1987:9).

The NMFS mandate is for the provision of scientific information on the fish stocks status and catch statistics in support of the Council's activities. This biological and statistical information can be (and often is) is challenged by the fishery participants themselves, who can contract for alternative biological assessments. As well, NMFS has a legislated responsibility to review all Councils FMPs in order to ensure that they comply with the National Standards as set out in the FMCA 1976.

The Councils mandates are to manage all marine resources from the state 3 mile limits to the 200 mile EEZ.⁵ The Councils provide a public forum for tabling and discussing the scientific information, developing management plans, and proposing regulatory control measures. The Councils species FMPs and control measures once developed and agreed upon through series of mandated public meetings are forwarded, according to the FMCA, 1976 legislated timetable, to Washington for review by NMFS staff and approval by the Secretary of Commerce. At all levels of the process, (the federal, the public meeting and the state levels) political influence can and is exerted to modify or change the provisions of species FMPs as interest groups lobby for their particular concerns and interests.

The individual State governments are mandated to use their legislative authority to manage the marine resources within the 3 mile territorial boundary limits off their coastlines.⁶ For some fisheries, the State management authority has been further delegated to individual towns (for example shellfish in most New England States) and/or shared between state and town governments (for example alewives, sea herring, shad species which migrate along the coasts) (Peterson and Tierkla,

⁵In accordance with President Reagan's proclamation of March 10, 1983 establishing an exclusive economic zone (EEZ) the term fishery conservation zone was changed to EEZ. The United States now claims sovereign rights and exclusive management authority over all living and nonliving resources within 200 miles of the coastline, not just fisheries.

⁶Under the FMCA, 1976, the federal government has the authority to preempt state authority in state waters under narrowly prescribed circumstances. If a fishery is managed under a FMP, occurs predominantly in the EEZ and could be adversely affected by a state government action, the federal government can preempt the state's fishery management authority in it's three mile territorial seas. However, before any federal action can be undertaken, formal administrative hearings must first be conducted in order to justify any such action.

1987:10).⁷

⁷ Peterson and Tierkla (1987) provide a discussion on the administrative arrangements between the New England states for managing fisheries that overlap several individual state jurisdictions or federal/state jurisdictions (for example lobster, shrimp, striped bass, blue fish). They point out that programs such as the state/federal one between NMFS and the Atlantic States Marine Fishery Commission have had both successes and failures in developing coordinated management arrangements.

APPENDIX C

Canadian fisheries legislation

In Canada, the federal fisheries management system is essentially based on three legislative Acts, the Fisheries Act, the Coastal Fisheries Protection Act and the Territorial Sea and Fishing Zones Act.

Through the provisions of the BNA, 1867, the Canadian parliament enacted the Fisheries Act which deals with the protection of the fisheries in Canadian waters. The Governor-in Council (Cabinet) has the ultimate authority (power) to make laws (regulations) for the management of the fishery resources. One of it's appointed members, the Minister of Fisheries "in his absolute discretion" may issue fishing licences (Thompson, 1974). The authority to licence gives the federal state the ability to limit access to the resources and thus control who can participate and under what conditions in the fishery. A measure of the encompassing authority of the Fisheries Act can be illustrated by the amendment in 1961 which subjects any Canadian fishing vessel operating anywhere on the high seas to it's provisions. This feature has benefited Canada's international reputation for fishery management effectiveness when dealing with and negotiating with other fishing nations on fishery matters. Most other countries lack this level of legislative control over the activities of their fishermen. International agreements on fishery management matters (conventions, treaties, control measures) can be made to apply to Canadian vessels regardless of where they operate (outside Canada's territorial seas or not). This has enhanced Canada's

international stature as a nation highly concerned with conservation and protection of fishery resources (original ICNAF member and later leading NAFO member).

Another important legislative Act is the Coastal Fisheries Protection Act, which has been in a number of different forms going back to 1868. This Act provides Canada the authority to protect the fisheries within Canadian jurisdiction from encroachment by foreign fishing vessels. The Act regulates the conduct and activities of foreign fishing vessels in Canadian waters and ports by requiring them to be licensed and subject to particular fishing restrictions as deemed necessary.

The Territorial Sea and Fishing Zones Act is the third important Canadian fisheries statute. This Act was passed in 1964 in order to provide a legislative mechanism for extending Canada's fisheries management jurisdiction. The Act initially established a three mile territorial sea limit and an exclusive 9 mile fishing zone contiguous and seaward of this limit (Consolidated Statutes of Canada, 1977). In 1970, the Act was amended and provided a twelve mile territorial sea limit in the waters adjacent to the coastlines of the mainland and islands of Canada. In 1971, Orders made pursuant to the Act established exclusive fishery Zones in the Gulf of St. Lawrence and Bay of Fundy on the Atlantic coast and the Queen Charlotte Sound, Hecate Strait and Dixon Entrance on the Pacific coast (Fishing Zone Orders 1, 2, and 3 of Canada). On January 1, 1977, the Fishing Zones Orders 4, 5, and 6 extended Canada's fishery jurisdiction an additional 188 miles seaward from the territorial sea boundaries creating the so-called 200 mile limit.

APPENDIX D

Maps of NAFO Stock Areas and DFO Scotia Fundy Region

