

Management of the Intertidal Clam Resource: A British Columbia Experiment in Limited Entry and Local Participation

Darcy A. Mitchell, Ph.D. Candidate

School of Public Administration

University of Victoria, Victoria, BC V8W 2Y2

In the mid 1980s, the intertidal clam fishery in British Columbia experienced a short lived bonanza, based primarily on an introduced species—the manila clam. In 1989, as a result of overharvesting and other factors, one of the most productive manila clam fisheries on the B.C. Coast—Savary Island—was closed. The Federal Department of Fisheries and Oceans re-opened the Savary Island fishery in 1994 under a pilot management project that involved both license limitation and the establishment of a Community Management Board. This paper presents the results of a review of this pilot project and suggests a number of steps that, if taken, could enhance the prospects for greater community control of the commercial clam fishery.

Introduction

Between 1980 and 1988, landings of intertidal clams in British Columbia rose from 1,630 tonnes to 4,515 tonnes, with a landed value of almost \$8 million. As has been the case in many fisheries, this bonanza was short lived. By 1992, landings had dropped to less than 1,350 tonnes (DFO, 1994).

The Federal Department of Fisheries and Oceans (DFO) responded to increasing numbers of clam harvesters and increased harvester effort in several ways, including conservation closures. In 1989, one of the most productive clam fisheries on the British Columbia coast—Savary Island—was closed.

This paper presents the findings of a review of management initiatives that were implemented in 1994 on a pilot project basis as a condition of the re-opening of the Savary Island fishery in Clam License Area C (Sunshine Coast). License limitations were introduced, resulting in a decline in authorized harvesters in Area C from an estimated 400 in 1989 to some 120 in 1994, with 50 per cent of licenses guaranteed to aboriginal harvesters. As well, a Community Management Board was established with representation from both aboriginal and non-aboriginal communities. The paper reviews the impact of the Area C pilot project on the local clam fishery and discusses the issues that the Board has faced; these include the development of criteria for allocating opportunities in the commercial fishery, the challenge of monitoring and enforcing such allocations, and the long-term prospects for maintaining a viable fishery based on the intertidal clam resource.

Approach and Methodology

Research for this review was carried out primarily through a series of more than 40 interviews, each between 45 minutes and three hours in length, conducted during January and February of 1995 with commercial clam harvesters; members of the Area C Clam Management Board; representatives of First Nations; officials of the Department of Fisheries and Oceans and the British Columbia Ministry of Agriculture, Fisheries and Food; shellfish buyers and processors; and other individuals concerned with the commercial clam harvest in Area C. A meeting was also held with a group of former and aspiring commercial harvesters from the Sliammon First Nation. Federal and provincial documents, including research reports, marketing studies, conference proceedings, and correspondence were reviewed, together with minutes and other documents generated by the Area C Clam Management Board. Interim findings and a draft final report were presented for discussion at meetings of the Board in February and March, 1995.

Intertidal Clams: The Nature of the Resource

Of the more than 400 species of bivalves found along the coast of British Columbia, only a few are harvested in the commercial, recreational or aboriginal food fisheries. Of these, four species of clams comprise the majority of intertidal clam landings: butter (*Saximodus giganteus*), littleneck (*Protothaca staminea*), manila (*Tapes philippinarum*) and razor clams (*Siliqua patula*).

With the exception of razor clams, the main commercial species are found primarily in bays, inlets and estuarine areas, and are often described collectively as “bay clams”. In contrast, razor clams inhabit surf-swept ocean beaches such as those on the west coast of Vancouver Island and the Queen Charlottes.

Historically, butter clams were the major species harvested in commercial, recreational and subsistence fisheries.¹ This species, which can attain a shell length of 110 mm, is relatively slow growing and may take up to seven years to achieve the minimum legal harvest size of 63 mm.

Since 1971, the commercial fishery in British Columbia has focussed primarily on native littlenecks and the introduced manila clam. Native littleneck and manila clams are similar in size and appearance, with each species attaining a shell length of about 65 mm. The shell of the littleneck is oval to round, with distinct radial and concentric ribs, and is white, grey or brown in colour. Littlenecks usually occur on firm gravel or mud-gravel beaches at slightly higher intertidal levels than butter clams. Manila clams, which were accidentally imported to British Columbia with Japanese oyster seed, are grey, brown or variegated in colour. The minimum legal shell size for both littleneck and manila clams is 38 mm, a length which can be achieved in about three and half years in the Straits of Georgia and in five to six years in more northerly waters.

Razor clams, which occur in large concentrations only on the west Coast of Vancouver Island and on the northeast coast of Graham Island in the Queen Charlottes, have a long, thin shell covered with an olive green or dark brown shiny layer. The shell can reach a length of 180 mm, with legal harvest size of 90 mm being achieved in three to four years.

As mechanical harvesting is illegal in British Columbia, the wild clam fishery is harvested exclusively by hand, using some form of rake, fork or shovel. Manila clams, which occur very close to the surface of the beach, can be harvested very efficiently with rakes; on a good clam beach a proficient harvester can take about 300 pounds per tide. Harvests may rise to nearly 1,000 pounds on a particularly productive beach.

The Commercial Clam Fishery in British Columbia

The Wild Fishery

A commercial fishery for clams in British Columbia began at the turn of the century, but landings of individual species were not recorded until 1951. Since 1951, total landings by weight have ranged

from a low of 581 tonnes in 1969 to a high of 4,515 tonnes in 1988 (DFO, 1994). Since 1988, landings have dropped dramatically; only about 1,340 tonnes were landed in 1992. Landed value also reached a peak in 1988, totalling \$7,770,000, before declining to approximately \$2,720,000 in 1993. Since 1983, the manila clam has been the dominant species in the commercial fishery (DFO, 1994).

The growth of the commercial clam fishery began in the recession years of the early to mid-1980s, when limited alternate employment opportunities led to increased competition in the clam harvest, especially by itinerant harvesters, many of them new Canadians. Rising prices further increased competition for the clam harvest, while older accumulated stocks on many beaches attracted harvesters with the prospect of high catch per digger ratios. It is now believed that accumulated clam stocks in southern British Columbia have been exhausted and that future harvests will largely depend on annual recruitment. Since 1991, total annual landings and landed values have remained fairly consistent. During this same period, prices for manila clams (landed value) have fluctuated between about \$1.00 and \$1.20 per pound, on average.

Increased harvest pressure since the early 1980s has coincided with accelerating losses of shellfish habitat due to contamination from municipal sewage outfalls, faulty septic tanks, agricultural and other upland run-off or discharge from vessels. Most of the closures have occurred in the most popular and accessible harvesting areas, particularly the Strait of Georgia. As the main source of contamination is municipal sewage, rapid population growth in the Lower Mainland, Sunshine Coast and eastern Vancouver Island can be expected to result in continuing loss of shellfish habitat to the commercial fishery.

The federal Department of Fisheries and Oceans is responsible for the management of the wild clam fishery. Beginning in 1988, DFO introduced significant changes in the management of the wild clam fishery. First, opening times were reduced in 1988, due to increased numbers of harvesters. The following year, fishing times were further reduced, and openings were staggered through the year in an attempt to maintain a continuous market supply. At the end of 1989, Savary Island, once a highly productive fishery, was closed. Currently, statistical area 27 is closed for conservation purposes.

Licensing policies were also changed to attempt to better control harvester effort and to provide better information to fishery managers. Before 1989, anyone possessing a Personal Commercial Fishing License (PCFL) was permitted to harvest wild clams. The Department of Fisheries and Oceans estimates that 3,000 to 4,000 of

the 20,000 PCFL holders in 1988 harvested clams on a commercial basis. In 1989, however, area licensing was introduced, and clam harvesters were required to purchase a clam license specific to one of six newly created clam management areas in addition to their Personal Commercial Fishing License (recently renamed "Fisher's Registration Card"). In 1992, Queen Charlotte Sound became a seventh license area.

In 1989, a total of 1,870 licenses were issued, rising to 2068 in 1990 and dropping back to 1,843 in 1991, 1,814 in 1992 and 1,639 in 1993 (DFO, 1995).

With the exception of Savary Island in Area C and the Heiltsuk pilot project, neither overall nor individual quotas are established for commercial clam harvests. The main conservation method used in the management of the commercial fishery is a minimum size limit that permits clams to spawn at least once before they are harvested, together with area and time restrictions. The wild commercial fishery is also restricted by the designation of recreational reserves, provincial park closures and aboriginal fish reserves.

Reduced seasons and area closures have severely limited employment opportunities in clam harvesting and incomes are generally low. According to sales slip records for 1990, 87% of clam harvesters earned less than \$5,000 from the sale of clams (DFO and MAFF, 1993:3).

Depuration

Depuration plants, which allow clams from waters marginally contaminated by sewage (but not industrial pollutants or PSP) to be purged in sterilized sea water, have permitted the harvest of clams from areas that were formerly closed, including the Sooke Basin and Harbour and Ladysmith Harbour. Depuration is not presently available to deal with PSP or contamination by industrial waste. The proportion of clams now being depurated in British Columbia may be as high as 20% (DFO and MAFF, 1994:41).

Aboriginal Fisheries Strategy

DFO has entered into a number of arrangements with First Nations organizations under the Aboriginal Fisheries Strategy to increase aboriginal involvement in the harvest and management of shellfish. These include an agreement with the Heiltsuk Band Council for exclusive access to shellfish within a designated area for the period 1992–1996 (DFO and MAFF, 1994) and a three-year agreement with the Council of the Haida Nation (CHN) concerning the

razor clam fishery, effective from 1995 to 1997. Under this agreement, the CHN receives a Communal License for the Haida fishery, while non-Haida harvesters continue to receive clam licenses from DFO (CHN, 1995).

Clam Culture in British Columbia

In 1989, there were 13 clam culture tenures in British Columbia, most of them coincident with oyster tenures (Bayley, 1989). By 1992, this number had risen to 70 licenses on 255 hectares. Twenty-tonnes of cultured manila clams were produced in 1990 and 305 tonnes in 1992—a more than 10-fold increase (DFO and MAFF, 1993 and DFO and MAFF, 1994). The value of cultured clams in 1992 was about \$2 million (DFO and MAFF, 1994).

The Department of Fisheries and Oceans, the British Columbia Ministry of Agriculture, Fisheries and Food (MAFF) and the B.C. Ministry of Environment, Lands and Parks (ELP) are all involved with the administration of clam culture activities, with MAFF being the lead agency for shellfish culture.

Reforming Management of the Intertidal Clam Fishery

In 1992, DFO and MAFF jointly initiated a review of clam fishery management. The following year, a discussion paper entitled “The B.C. Intertidal Clam Fishery: Options and Opportunities” was distributed to clam harvesters, processors, aquaculturists, First Nations, municipal and regional governments, the Islands Trust and other interested individuals and organizations (MAFF and DFO, 1994). The discussion paper outlined the history of the intertidal clam fishery in British Columbia and identified “key concerns” in the management of the wild clam resource. The paper observes that:

The wild clam fishery has been treated as common property shared by an unlimited number of licensed harvesters. The tragedy of this commons is that the harvesters are not willing or able to husband the resource because they must compete with other harvesters for part of the harvest. The pressing issues in clam management are classic symptoms of common property management (DFO and MAFF, 1993:8).

In addition to issues noted earlier in this paper, i.e. shortened fishing seasons, lost clam beds, reduced income and employment opportunities and underfunded programs for PSP monitoring and growing water surveys, DFO/MAFF also identified as key concerns:

- illegal harvesting in closed areas (poaching), especially poaching of contaminated clams;
- market considerations, including frequent gluts of fresh product resulting from short, intense commercial fisheries;
- uncertain stock levels. Relatively little is known about the effect of repeated digging on clam survival and growth rates or about the effects on recruitment of removal of an entire legal sized clam population.

As Jamieson and Francis note, stock surveys of shellfish are expensive and difficult to carry out because the animals are immobile and populations are widely dispersed geographically (1986:733–74). Further, rates of recruitment in clam populations vary widely from year to year as a result of environmental, as well as harvesting, factors. As clam harvests now depend almost entirely on annual recruitment, poor scientific information is a major obstacle to improved resource management.

The 1993 Discussion Paper proposes three options for increasing harvester incentives for protection and enhancement of the clam resource:

1. Limited participation, based on catch or license history;
2. Fixed harvest shares, through either individual quotas or enterprise allocations; and
3. Site specific access, such as foreshore tenures or wild harvest area stakes.

Benefits and drawbacks of each of these options are discussed in the paper. To the extent that the document reflects the preferences of the two governments, limited participation (i.e. limited licensing) appears to be the least preferred option because it does not alter harvesting incentives and provides no individual responsibility or motivation for husbanding or enhancing the clam resource. Allocation of shares of the harvest, either through individual or group quotas is considered a more desirable option, with a preference indicated for enterprise (group) allocations. The Discussion Paper notes, however, that establishing a sustainable harvest level in the clam fishery is extremely difficult, due to annual variations in recruitment and lack of resources for stock assessment. From the perspective of the Discussion Paper, the preferred option appears to be site specific access, whether through expansion of foreshore leases or “staking” of wild clam areas. The anticipated objections to this option are, as would be expected, further restrictions in public access to foreshore areas; displacement of casual or part-time har-

vesters; overall losses of employment, particularly if mechanical harvesting is introduced on shellfish tenures; and windfall gains to those who receive exclusive harvesting privileges. On this last point, the Discussion Paper notes that:

...windfall gains rightfully belong to the people of Canada, the owners of the clam resource. Auctioning the privileges or taxing the landings could recover the resource rent from the fishery (DFO and MAFF, 1993:16).

In addition to these three major options for management reform, the Discussion Paper proposes increased funding by industry of programs which would enable new fisheries to be developed, including stock assessment and health and safety monitoring, and suggests the creation of Community Management Boards to increase stakeholder involvement in fishery management.

Consultation with individuals and groups concerned with the intertidal clam harvest yielded a number of common themes in stakeholder concerns, including the problem of pollution and other causes of lost clam habitat, and perceived needs for increased local input into local management, improved marketing, increased management resources, more stable employment opportunities and increased government coordination. Surcharges or landing taxes were proposed by some as a means of supporting enhanced management activities. Not surprisingly, all stakeholder groups were concerned that they maintain or increase their share of the clam resource. There were no clear preferences for any of the management options proposed in the Discussion Paper; while the DFO/MAFF Summary of Stakeholder Consultations is rather vague, it appears that preferred management options coincide rather directly with the current position of individuals or groups in the industry—clam farmers prefer expansion of shellfish tenures, First Nations prefer communal licensing or quotas with a minimum allocation of harvest share to aboriginal interests, and so forth.

The impact of uncertainty surrounding treaty negotiations was highlighted in the course of the consultations as was the concern that auctioning rights to the clam resource would prejudice economically disadvantaged groups who have traditionally comprised the majority of clam harvesters.

The Area C Commercial Clam Fishery

License Area C (Sunshine Coast) comprises most of statistical areas 15 and 16 as well as area 29–1 (Figure 1).

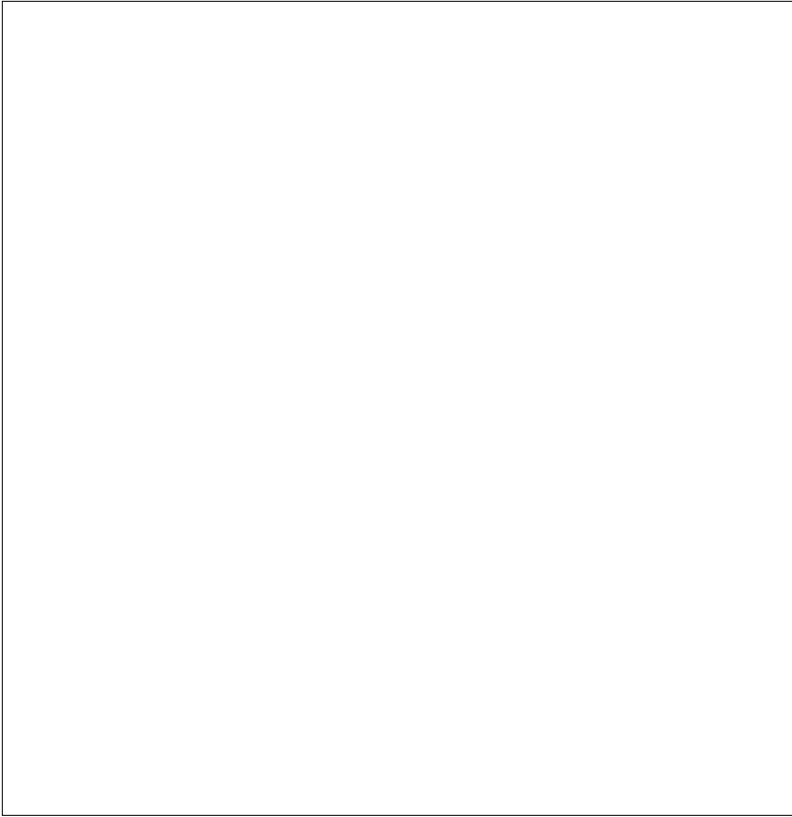


Figure 1 Clam License Areas.

The communities most involved in the commercial clam fishery in Area C are 1) those situated within the Regional District of Powell River and 2) three First Nations—Sliammon, Klahoose (on Cortes Island) and Sechelt. The Regional District covers almost 10% of the land area of B.C., but contains less than 1% of the provincial population—about 19,250, including the aboriginal population (B.C. Stats, 1994).

In the past, Savary Island (in statistical area 15) has been the most productive location in Area C; in 1989, area 15 landings peaked at 753 tonnes. When Savary Island was closed for conservation reasons at the end of 1989, Area 15 landings fell to an estimated 66 tonnes (145,200 pounds) in 1990.

In conjunction with the closure of Savary Island, the number of Area C license holders dropped dramatically, from 400 in 1989 to 184 in 1990. Between 1990 and 1993, the number of license holders

fluctuated between about 170 and 200. It appears that many of those who did not renew Area C licenses after 1989 were non-resident harvesters.

From 1990 to 1993, the number of openings in Area C dropped steadily; the Area was open for 48 days in 1991 and only 16 in 1993.

The Area C Clam Management Pilot Project

Initiation of the Project

The Area C Clam Management Project originated in two sets of events: 1) the decision by DFO to re-open Savary Island for a small **controlled** commercial fishery and 2) discussions with and proposals submitted by the Area C Clam Harvesters Association and the Sliammon Nation during the consultation process concerning a Federal/Provincial discussion paper about reform of the clam fishery in British Columbia. Both the Sliammon Nation and the Area C Harvesters Association supported a community-based management program with a limited number of harvesters and, perhaps most significantly, both groups agreed that for the purposes of the pilot project, 50% of harvesting opportunities should be ensured to aboriginal harvesters. Support by community groups facilitated implementation of a limited entry fishery for Area C, while the Federal/Provincial Discussion Paper, which had contemplated increased opportunities for a community management reform process, provided a sort of policy "umbrella" for the establishment of a Community Management Board.

The project was launched at a meeting hosted by the Sliammon Nation on February 3, 1994. The meeting was attended by about 60 harvesters, representatives of the Klahoose Nation, a few processors, and a Savary Island resident, together with a number of DFO officials. Those present at the meeting gave their support to establishment of a limited entry fishery with 50% aboriginal participation and indicated their preference among options for 1994 license eligibility criteria. Those present also supported the creation of a Community Management Board, with 50% aboriginal participation. The members of the board were, initially, two Sliammon representatives and two members of the Area C Clam Harvesters Association, together with DFO involvement on an ex officio basis.

Eligibility Criteria

At its initial meeting, the newly formed Community Management Board ratified the 1994 license criterion as possession of an

Area C Clam license in two of the three years 1991, 1992, and 1993. Based on this criterion, 93 individuals in total were expected to be eligible to purchase 1994 licenses; of these about 24 were identified as Band members. In order to bring participation up to the stipulated 50%, an additional 27 "make-up" licenses were to be issued to First Nations for distribution to their members. (DFO's original intention was to issue these licenses as communal licenses under Aboriginal Fishery Strategy agreements; such agreements have not been implemented to date.)

The Board also established criteria for license appeals. These were:

- 1) The appellant must have been a resident of Area C for 5 years (1989 to present); and
- 2) The appellant must have held an Area C clam license for two of the years, 1989 to 1993 inclusive; and
- 3) The appellant must have had significant income from the clam fishery supported by Income Tax returns for those two years; and
- 4) The appellant must have had a medical reason (supported by a doctor's certificate) or educational reason for not meeting the criteria; and
- 5) Lack of training for any other job opportunities may be considered.

It was agreed that DFO officials would conduct the license appeals process for the 1994 pilot project.

Following the appeals procedure and the final calculation of required aboriginal "make-up" licenses, 129 individuals were deemed eligible to purchase Clam licenses for Area C in 1994. Of these, eighteen individuals did not apply for a license before the end of December, 1994 (DFO, 1994-a).

Board Membership

As noted above, the Board originally consisted of two Sliammon members, two non-aboriginal harvester members, and an ex officio member from DFO. During the first few months of operations, membership on the Board changed. One of the Sliammon representatives was replaced by a nominee from the Sechelt Nation and a third aboriginal member joined the board on behalf of the Klahoose Nation. To balance the increased aboriginal membership, an additional non-aboriginal representative was recruited. The process of selecting members for the Board was rather informal; individuals who

had traditionally been interested and active in clam harvesting and management issues volunteered to represent the non-aboriginal harvesters while Sliammon was represented by members of the Sliammon Clam Diggers Committee. The other First Nations were represented by staff members responsible for marine resource management activities of the respective First Nation governments. The third non-aboriginal member was suggested by DFO to provide some processor/buyer perspectives to the Board. The Savary Island Residents Association and the Sport Fishing Advisory Board were invited to participate in the board, but neither group sent representatives to meetings in 1994.

The 1994 Fishery

Harvest levels

Savary Island and the remainder of Area C were treated, in some respects, as separate management areas for the 1994 fishery. There were, for example, no overlapping openings for Savary Island and the remainder of Area C. The Department of Fisheries and Oceans established a quota of 250,000 pounds for Savary Island; no quota was established for the rest of Area C, although it was expected that an additional 250,000 pounds would be harvested. By the end of the 1994 season, landings of 265,000 pounds were reported for Savary, and 166,600 pounds for the rest of Area C. (It is believed that some of these landings were in fact Savary Island clams).

The Area C Management Board established fishing plans for the Area in consultation with DFO, generally on a monthly basis. In 1994, Savary Island was open for a total of 11 days and the rest of Area C for 25 days, for total openings in the Area of 36 days—more than twice the number of 1993 openings.

Marketing and distribution

Clam prices in Area C were relatively higher than those in other areas, reaching, on occasion, \$1.60–\$1.70 per pound, compared with an average of about \$1.40 in 1993. Pending final information on 1994 landings, comments of processors and harvesters suggest that the 1994 average price was about \$1.50. In other parts of the Coast, prices were more in the range of \$1.20 per pound—close to recent historical averages. The higher prices may be accounted for by three factors: competition by buyers, fewer harvesters (and hence smaller harvests per/opening and less “glut”), and high quality clams.

Monitoring and enforcement

Fisheries officers patrolled Savary Island during four openings: September 10 and 14, October 28 and November 15. Officers also did periodic patrols of Area C beaches accessible by motor vehicle, but the main focus of monitoring and enforcement effort was the highly productive Savary Island fishery.

Although the involvement of Aboriginal Fishery Strategy (AFS) guardians in the monitoring and enforcement of the 1994 fishery was discussed by the Board, no formal arrangements were made for such involvement. The AFS guardian for Klahoose (who brought the Klahoose harvesters by boat from Cortes Island) helped DFO on some patrols, and also carried out some monitoring alone. The Sliammon AFS Guardian monitored Band oyster leases during openings, but was not involved in patrols in other areas.

DFO enforcement officials state that the enforcement situation in Area C in 1994 was quite different from that in other Areas. Relatively few complaints were received from Area C about illegal harvesting in contaminated areas or poaching on oyster leases (which are the commonest type of complaints on other parts of the Coast). Rather, numerous reports of illegal harvesting during closures were received from "stakeholders" (i.e. licensed harvesters) in Area C. In the view of DFO officials, the high level of complaints in Area C is related, at least in part, to an increased sense of ownership and investment in the Area C clam resource by licensed harvesters.

As will be discussed later in this paper, actual levels of illegal harvesting (poaching) in Area C are unknown and perceptions of the nature and severity of poaching vary among different groups and individuals, as do recommendations for addressing enforcement problems.

Board structure and operation

The Board is not established as a legal entity (e.g. a society) and receives no direct funding from government or other sources. DFO did not supply formal terms of reference for the Board nor were they negotiated between the Board and the Department. In the absence of federal legislation, regulation or formal policies concerning the role, mandate and responsibilities of community management institutions, the Board has functioned as an advisory body to DFO on the management of the Area C clam fishery.

Issues Raised During Review of the Area C Clam Management Program

A large majority of those interviewed stated that the 1994 fishery was very acceptable in terms of orderliness, harvester opportunities, and quality of product. There were no complaints reported to DFO from Savary Island residents; a representative of the Residents' Association noted that the problems which had occurred in the fishery when Savary was previously opened (noise, vandalism, and littering) were not present in the 1994 fishery. Most respondents mentioned some level of poaching as a problem; this issue is discussed in detail in a later section of this paper. In comparison with Savary Island fisheries in the late 1980s, which were variously described by interview respondents as "crazy" or "uncontrollable", the 1994 fishery was considered a vast improvement, primarily due to the implementation of limited entry to the fishery and the establishment of a harvest quota for Savary Island.

The balance of this section addresses six issues raised during the review:

1. What were the objectives of the Area C Clam Management project?
 2. Have these objectives been achieved?
 3. Were opportunities in the commercial fishery allocated on a reasonable and equitable basis?
 4. Was there adequate compliance with fishery management objectives and rules?
 5. Did the fishery meet the needs of processors and markets?
 6. How can management of the fishery be improved?
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1. *What were the objectives of the program?*

Project documentation and interviews with board members, harvesters and government officials suggest that those involved with setting up the project had two major objectives:

- a. To better ensure conservation/sustainability of the resource
- b. To develop the commercial fishery as a more viable livelihood for clam harvesters, especially for local residents.

Many of those interviewed felt that greater participation by, and control over, the management of the fishery was critical to achievement of both these goals. Board members and harvesters tended to emphasize the socio-economic impacts of the new management regimes, while DFO officials tended to emphasize conservation and

hoped-for improvements in DFO's ability to more effectively carry out its management responsibilities.

2. *Were these objectives met in the 1994 fishery?*

a. Impacts on conservation. A stock assessment of Savary Island beaches is planned for April, 1995; information on the effects of the 1994 fishery on Island stocks will be available once that assessment is complete. Some, but not all, board members and harvesters expressed the view that the quota established for Savary Island was overly conservative and that abundant stocks encouraged illegal harvesting. Other interview respondents felt that it was best to err on the side of caution, and pointed to low numbers of sub-legal clams as a sign that, while current stocks may be high, recruitment may be quite low.

Based on buyers' reports to DFO (hailed landings), the Savary Island quota was slightly exceeded.

b. Socio-economic impacts. License limitation in Area C has been very effective in increasing average returns to harvesters in comparison with other management areas. The mean number of pounds per license issued in Area C in 1994 was about four times the mean landings in other areas—some 4000 pounds per Area C license issued compared with between 750 and 1200 pounds per license issued in Areas where license limitation has not been introduced (DFO– Parkesville, 1995).

Based on 1994 reported landings of 431,600 pounds and an average price of \$1.50 per pound, the average income available to a licensed harvester in Area C in 1994 was about \$5,900, spread over a four-month season.

Even with licenses limited to approximately the current number of harvesters, the wild clam fishery cannot be said to provide a "full time" living for commercial harvesters. With good management, however, the resource should be able to provide a substantial source of income for persons whose other employment opportunities may be limited, especially in the winter months when seasonal employment is less available.

3. *Were opportunities in the commercial fishery allocated on a reasonable and fair basis?*

The Area C Clam Management project was launched on two points of agreement between aboriginal and non-aboriginal communities: that licenses should be limited and that 50% of licenses should be ensured to aboriginal harvesters. Since the inception of the project, consensus on these points appears to have eroded.

During 1994, both aboriginal and non-aboriginal members of the Board have experienced substantial pressure from individuals who feel aggrieved at having been excluded from the 1994 commercial fishery. These former harvesters feel that the license criteria do not adequately reflect long-standing involvement with the commercial fishery and penalize those who sought more productive fisheries after the closure of Savary Island. Aboriginal harvesters and First Nations representatives point to the predominance of native harvesters in the clam fishery before the manila clam "bonanza" of the 1980s; some contend that the allocation of harvesting opportunities should reflect this earlier concentration of aboriginal harvesters in the fishery. In the face of this pressure, both non-aboriginal and aboriginal Board members have proposed that additional licenses be issued to accommodate individuals with a long-standing involvement in the commercial fishery, but limited recent participation. At the same time, the majority of Board members and harvesters interviewed continue to support a range of 100–125 licenses as the optimal number of licenses for the fishery, at least for the foreseeable future.

Some First Nations harvesters and officials expressed the view that, while 50% is a minimum entitlement for aboriginal harvesters, the percentage should be higher, based on historic aboriginal involvement in the fishery and relatively greater employment needs among the native population. From the Sliammon perspective, at least, the distribution of "make up" licenses among the three First Nations is also a matter of concern, with some individuals feeling that Sliammon should be entitled to a larger share of existing "make up" licenses or to additional communal licenses for distribution by the Band. Non-aboriginal Board members, and most non-aboriginal harvesters interviewed, continue to support the allocation of 50% of licenses to native harvesters.

The treaty negotiation process is an additional and important consideration in the question of how commercial fishing opportunities will be allocated. Decisions taken under the current management arrangements are "without prejudice" to aboriginal rights and interests, and a final determination of opportunities in the fishery will not likely occur until treaties are concluded with the First Nations involved. In the meantime, the Board faces a number of decisions:

1. Can the three First Nations and the non-aboriginal harvester community agree on a recommendation to DFO concerning allocation of harvesting opportunities among the various groups, pend-

ing a definitive settlement of the issue which may not occur for a number of years?

2. Are there any possibilities for involving individuals who wish to participate in the commercial harvest, but are now excluded, without undermining the objectives of limited entry? Some options that might be considered include:

- re-allocating some, or all, of the licenses that were not purchased in 1994 and which remain unissued in 1995;
- providing for the re-allocation of licenses that are not renewed in future;
- allowing some licenses to “float”, i.e. to be issued to successive users during the season. This may meet some of the needs of the aboriginal communities in particular;
- establishing minimum landings requirements to qualify for retention of a license. (Even quite low quantities may be sufficient to deter speculation in clam licenses, which has been identified as a concern in this and other fisheries.)

4. *Was there adequate compliance with fishery objectives and rules?*

How much poaching actually occurred in the 1994 fishery? In the absence of documentation, it is impossible to say. As noted above, however, DFO enforcement officials consider that the situation in Area C was fairly well under control, especially as compared with other years, and with other management areas. Board members and non-aboriginal harvesters tended to believe that monitoring and enforcement were inadequate in 1994 and that poaching was a “very serious” or “somewhat serious” problem; aboriginal harvesters were less likely to view enforcement as lacking and poaching as a problem. DFO acknowledges that additional resources for enforcement would be highly desirable, but that, given current and expected funding levels, significant increases in enforcement effort are not likely unless new sources of funding become available, such as payments by harvesters toward the expenses of managing the fishery.

Who is responsible for illegal harvesting? Different individuals and groups had differing views about the most likely candidates; suggestions included:

- currently licensed harvesters;
- harvesters from other areas;
- previously licensed harvesters who were excluded from obtaining licenses in 1994;
- holders of clam tenures;
- processors and buyers;
- individuals with aboriginal food fish permits.

With few exceptions, most individuals interviewed believed that illegal harvesting by non-resident (transient) diggers was not a major factor in the 1994 Area C fishery. Several respondents expressed the view that poaching would not be so prevalent if some processors were not buying clams that they knew (or ought to have known) were not legally harvested.

According to interview respondents, poaching takes various forms. Some of those mentioned are:

- harvesting clams before openings and storing them;
- digging on beaches with contamination closures;
- harvesting wild clams and “laundering” them through clam leases from which product may be sold year round;
- harvesting clams in one area and selling them into another area opening;
- harvesting clams under an aboriginal food fish permit and then selling them under another individual’s commercial license.

While firm conclusions cannot be drawn about the nature and extent of clam poaching, the comments of most respondents suggest that much of the activity in Area C is a “local problem”. At least some of the poaching scenarios described by respondents would require either active participation by or the cooperation of, licensed harvesters. While many harvesters interviewed expressed a growing sense of ownership of the local clam resource, one year under a new, and possibly temporary, licensing regime is probably not sufficient to induce harvesters to act like textbook stewards of the resource.

Some individuals from both the aboriginal and non-aboriginal communities feel that the criterion for distributing licenses was not fair. In the case of aboriginal individuals, some perceive their exclusion from harvesting not simply as an individual grievance, but as an injury against their community or Nation as a whole. To the extent that this perception exists, noncompliance with fishery regulations, whether they are made by DFO or by a Community Management Board, may be viewed by the individuals involved and others in their community as a case of (justified) civil disobedience rather than infraction of reasonable and fair rules and laws. One of the challenges facing management of the clam fishery in Area C is to achieve a broader understanding and acceptance of the objectives of the management regime and of the need for harvester self regulation.

5. *Did the fishery meet the needs of processors and markets?*

Most processors were relatively well satisfied with the 1994 Area C Clam fishery, although several expressed reservations about the wild clam fishery in general. Quality in Area C was considered good. Concerns raised included the following:

- because of the productivity of Savary, less effort was expended on other parts of the Area than processors had expected and yields were consequently lower;
- harvester effort, particularly on the latter days of multiple-day openings, was unpredictable. Sometimes processors were unable to purchase enough clams to make the buying trip worthwhile;
- buyer competition and “shopping around” for higher prices by harvesters also made it difficult for some processors to predict purchases.

6. *How can management of the fishery be improved?*

As noted above, an essential requirement for the effective management of the Area C fishery is for the parties involved to agree, at least on a provisional basis, about the allocation of opportunities in the commercial clam fishery. Without such agreement, this issue will continue to dominate management concerns and will make it very difficult to deal with other issues.

Effective monitoring and enforcement of the fishery was identified by most respondents as a management priority: the benefits of controlling harvests at sustainable levels or investing in improved stock assessment or enhancement cannot be secured to investors unless the resource can be protected.

Interview respondents suggested a number of approaches to improving monitoring and enforcement, with the most frequently mentioned proposals being:

- increase DFO patrols, both during and before openings;
- increase monitoring of processors and/or increase penalties for infractions
- regulate leaseholders more closely to reduce “laundering”;
- more self-regulation by harvesters;
- increase penalties for illegal harvesting;
- make greater use of AFS guardians;
- avoid issuing food fish permits during commercial openings.

As mentioned earlier in this paper, the involvement of AFS guardians in the clam fishery has been discussed, as has the possibility of volunteer monitoring by license holders, especially during

fishery closures. DFO officials have indicated their willingness to facilitate a joint session of harvesters, AFS guardians and DFO enforcement staff to coordinate monitoring and enforcement efforts.

With respect to concerns about clams “laundered” through leases, DFO and the provincial Ministry of Agriculture, Fisheries and Food (which is responsible for management of shellfish tenures) have agreed to jointly investigate this concern.

In the matter of aboriginal food fish permits, the Chief and Council of the Sliammon Band have advised that they are concerned about misuse of these permits for commercial sales, are reviewing the permit system, and have requested local fisheries officers to enforce the conditions of the permits.

Part of the enforcement problem is, however, a straightforward lack of resources for more DFO patrols. As discussed below, the Area C Board has proposed that funds be raised from harvesters for management purposes; if this can be achieved, Board members and harvesters have identified enforcement as a major priority for increased funding.

Board members and harvesters also expressed concern about

- the accuracy and reliability of clam stock assessments as conducted by DFO;
- lack of funding for growing water surveys, with the result that some areas are closed on a year round basis, when only seasonal closures might be required.

On the issue of stock assessment, DFO has advised the Board that the department is developing a standard protocol for stock assessment that would provide guidelines for independent third-party surveys.

As noted above, the Area C Clam Management Board has repeatedly stated that commercial harvesters should contribute financially to management of the Area C clam fishery, preferably through a tax or levy on clam landings. (Such a landings fee was proposed by both the Sliammon Nation and the Area C Harvesters Association in their submissions concerning a new management process for Area C). At present, however, it is not clear how such a funding mechanism could be implemented or enforced. There is also an important issue of accountability: how will those who expend the funds be responsible to those who provide them, i.e. commercial harvesters?

The Role and Responsibilities of a Community Management Board

The Problem of the “Commons”

The 1993 Federal/Provincial Discussion Paper on the Reform of Intertidal Clam Management follows convention in referring to the circumstances of the wild clam fishery as a “tragedy of the commons” (Hardin, 1968). Two solutions are generally proposed for this “tragedy”. One is to place resources in private ownership; this is essentially what has happened in the oyster fishery. There is almost no wild oyster fishery in British Columbia now, although such a fishery once existed. Oysters are produced, rather, on what are essentially private beaches. The other solution is government regulation; government tries to make harvesters behave in ways that will conserve resources, even though there are strong individual incentives for overuse and abuse.

A third approach is for groups of people—clam harvesters, for example—to become more directly responsible for managing the resources that they use. This may involve governments’ recognizing and supporting a community’s traditional management activities, or it may involve the organization of new “communities” and new community management structures. In these arrangements—often called “co-management” arrangements—responsibilities are usually shared between governments and stakeholder groups. Sometimes these groups have a good deal of autonomy and authority under these arrangements; often their role is primarily advisory and educational.

The fundamental belief underlying this third approach is that groups of individuals with a shared interest in a resource can, in the right circumstances, manage themselves without being forced to behave in certain ways by an outside authority.

Government Management or Community Control?

What is a “community”?

The definition of “community” in the context of clam management reform is somewhat unclear. The 1993 DFO/MAFF Discussion Paper refers to both “a small group of stakeholders” and “local communities” in its brief discussion of community management boards. It is not clear, therefore, whether the idea of “community” is meant to be primarily that of a “community of interest”, i.e. a group of those who stand to gain or lose from decisions made concerning

the management of the clam resource regardless of their geographic location *or* a “local community” in the geographic sense.

In the case of the Area C project, members of the board and clam harvesters clearly identify “community” with “local clam harvesters”, a definition which is probably somewhat more restrictive than that intended by government in policy documents concerning clam management.

For the purpose of this paper, “community” is taken to mean a group of individuals who share a long-term interest in a natural resource *and* who perceive themselves to be members of such a group or community. While geographic proximity is not essential, it is often a central factor in permitting and encouraging relationships among individuals that contribute to their subjective sense of membership in a community.

A Management continuum

There is no strict division between “government management” and “community management”. A particular management arrangement may lie anywhere along a continuum from complete government control to complete community control. Private ownership may also play a role, with individuals, corporations or communal groups owning and managing part of the resource system. The location of a particular resource management regime along the government/ community continuum depends on the degree to which government or community groups are responsible for:

- determining what rules are necessary to manage the resource
- making the rules
- enforcing the rules
- paying for the expenses of making and enforcing the rules.

In the case of the current Area C Clam Management Project, management responsibilities have shifted slightly away from the “government” end of the continuum. While DFO continues to have sole legal responsibility for making and enforcing the rules, the Department has sought and accepted the advice of stakeholders in respect of:

- criteria for limiting license eligibility
- appeal criteria
- appropriate dates for fishery openings and closures.

The Board also provides an ongoing forum for issues and concerns of individual stakeholders and stakeholder groups to be brought to the attention of DFO.

While DFO continues to pay the majority of the costs of managing the fishery, stakeholders have assumed new costs in time and

expenses associated with their involvement in the management of the clam fishery.

Moving from government control to greater community self-management is usually a gradual process; the eventual results, that is the eventual position of a management regime along the government/community continuum, can vary widely. Experience in other resource situations suggests that community groups are most successful in managing their own use of a resource, with relatively little need for government involvement, support or regulation, in the following circumstances:

1. Those who benefit from the resource share the belief that, if they do not make and enforce rules about how the resource is to be used, they will all suffer.
2. Most resource users will be affected in similar ways by the new rules, that is, there will not be “big winners” and “big losers” as a result.
3. Most resource users expect to rely on the resource for income and employment for a long time into the future.
4. Most resource users know and trust each other.
5. Resource users can obtain and share information easily.
6. The costs of making and enforcing management rules are relatively low, especially for minor rule changes and minor infractions.
7. The resource system is well-defined and well-understood by all stakeholders.
8. The group of resource users is relatively small and stable (Ostrom, 1990).

These circumstances seem most likely to occur in small, geographically isolated communities whose members share many common traditions, values and beliefs, and where there is not a great deal of conflict about who is entitled to use the resource.

Where these circumstances do not apply, moving from government regulation to community control is likely to be a slower and more difficult process and to require a greater degree of ongoing government involvement and support.

The Area C Project—Prospects for Greater Community Control

At present, the Area C Clam Management Project faces a number of challenges in achieving a greater degree of community self-management. Few of the “ideal” circumstances listed above apply. For example,

1. There are at least four “communities” involved—the three First Nations and the group of non-aboriginal harvesters—and these communities are separated geographically and culturally.
2. The resource system to be managed is large and there remain many questions about how best to manage the clam resource to ensure long-term sustainability.
3. Because of geographic and cultural isolation, the various stakeholders are not all familiar with one another. There is some degree of mistrust and conflict among the stakeholder groups. Stakeholders do not have easy access to a common source of information, and cannot easily meet together to share information and concerns.
4. The new rules about eligibility for commercial licenses resulted in “winners” and “losers”, and there continues to be debate and conflict concerning the effects of license limitation.
5. There has been considerable turnover among commercial license-holders; there continue to be relatively large number of harvesters; and, for most harvesters, clam digging is a supplementary source of income, rather than their major livelihood. In the past, it has been easy to enter and leave the commercial clam harvest, both because of unrestricted licensing, and because of the low capital investment required.

The stakeholders involved do, however, appear to share some common beliefs:

1. That the commercial clam resource in Area C should be reserved to local residents.
2. That more effort is required in the management of the clam resource, and that harvesters should contribute toward increased management activities.
3. That local knowledge and understanding of the clam resource are important contributions to good management.
4. That aboriginal communities should be guaranteed a substantial share of commercial clam harvesting opportunities, based on their historic involvement in the fishery and scarcity of other employment opportunities.

Movement toward greater community control of the commercial clam resource requires, of course, not only the cooperation and commitment of those who benefit from the resource, but the sup-

port and commitment of government. At the time the Clam Management Board was established, the Federal-Provincial Intertidal Clam Management reform process was not concluded (and is not yet concluded). Consequently, the Board was established in the absence of a clear vision for the long-term management of the fishery, and without a clear understanding on the part of governments or stakeholders as to what the responsibilities, membership and organizational structure of community management bodies should be. The implementation of a successful community management structure requires:

- a clear definition of the respective responsibilities of DFO, the provincial Ministry of Agriculture, Fisheries and Food and other relevant governmental authorities;
- the responsibilities which should be assumed by community management authorities;
- the appropriate tools—in the form of legislation, regulation or policy direction; necessary funding (either provided by government or generated by stakeholders); and information and other organizational support—necessary to achieve the proposed transition from government regulation to shared responsibility with a community board.

Conclusion

The two components of the pilot project—license limitation and the management board—are closely linked. They are however, separable, in the sense that either could exist without the other. License limitation could be continued without any degree of stakeholder involvement in the management of the fishery, and, indeed, many of the benefits of the project are more directly attributable to the limitation of access to the commercial fishery than to the existence and operations of the Community Management Board.

In the long term, however, greater community involvement in management of the clam fishery offers better prospects than conventional government regulation for:

- greater acceptance of and compliance with management objectives and rules, thus reducing requirements for “outside” monitoring and enforcement;
- improved availability of resources for management activities, including the conservation and enhancement of the resource through the contributions of resource users.

To be effective, however, institutions for greater community participation require careful “crafting” (Ostrom, 1992). It often appears that consultative and participatory processes are established, generally at the behest of governments, without a clear understanding on the part of all participants of the purposes of such processes, without clear rules for participation, representation, accountability, and decision-making, and without a clear delineation of where a particular process fits within the larger institutional structure.

The Area C Clam Management Pilot Project requires greater clarity in a number of key areas if the project is to persist and to assume greater responsibility for management of the intertidal clam resource. First, the Department of Fisheries and Oceans and the Provincial Ministry of Agriculture, Fisheries and Food should conclude as soon as practicable the intertidal clam management reform process and should circulate the findings and recommendations of the review to stakeholder groups, including recommendations as to the desirable roles and responsibilities to be undertaken by community resource management bodies.

Second, as noted earlier in this report, the resolution of issues concerning allocation of commercial opportunities is fundamental to the effective management of the clam fishery in Area C, and particularly to the development of greater community management control. Decisions to be made in this regard include:

- the allocation of opportunities between aboriginal and non-aboriginal harvesters;
- the distribution of opportunities among the First Nations involved;
- provision for redistribution or termination of licenses which are not renewed by harvesters now and in the future;
- criteria, if any, for retention of license eligibility, such as minimum landings.

Third, the nature of the interests and constituencies represented by the Board members should be clarified, and selection processes formalized. At present, board members have been selected by largely informal processes and represent the perspectives of aboriginal harvesters, the governmental interests of First Nations, non-aboriginal harvesters, buyer/processors, the federal government, as well as the views of some individuals who have been excluded from the commercial harvest by the current licensing regime. Several of these interests are represented concurrently by individual board members, while other perspectives, such as those of the provincial and

local governments, shellfish tenure holders, and other users of the foreshore, are not represented at all. If the board is to remain advisory only, the representativeness and accountability of its members may be less crucial, but if the board is to develop and deliver management programs, and collect and expend funds for these purposes, representativeness and accountability must be ensured.

Fifth, the Board should develop a strategic plan which would address the following questions:

- How does the Board envision the commercial clam fishery in Area C developing in the long run?
- What steps are necessary to achieve that vision?
- What are the priorities? What has to happen first?
- What are the current opportunities for accomplishing these priorities? What are the constraints?
- What resources are needed to take action?
- Who has the resources? These may include information, legal authority, or funding.
- How will decisions be made in the management of the fishery and will decision-making differ according to the management issue involved? For instance, the Board could hold an advisory role only on some issues, but have decision-making responsibility, within overall DFO guidelines, on other issues. The structure of decision-making needs to be determined for each type of management decision.

Finally, the question of a mechanism for funding enhanced fisheries management needs to be addressed. While the concept of “user-pay” for fishery management costs is supported by both DFO and the Area C Clam Management Board, as noted earlier in this paper, there is no readily available and enforceable mechanism (with the possible exception of raising license fees) for collecting funds from harvesters for enhanced fishery management. There are two general possibilities:

1. DFO could establish a royalty or landing fee, and expend the funds collected either directly or through a third party such as the Management Board;
2. A community-based authority could collect fees either from harvesters directly or through some intermediary such as a First Nation or a harvester association.

While these suggestions were developed specifically for the Area C Clam Management Pilot project, they may prove helpful to others

involved in the development of “community management” or “co-management” arrangements.

Notes

1. This brief description of the intertidal clam resource is based primarily on Jamieson, G.S. and Francis, K. (Eds.). (1986). *Invertebrate and Marine Plant Fishery Resources in British Columbia*. Ottawa: DFO.

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