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1989 SOFT SHELL CLAM FISHERY MANAGEMENT PLAN

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1989 Soft Shell Clam Fishery Management Plan

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THE 1989 SOFT SHELL CLAM FISHERY MANAGEMENT PLAN

1989 SOFT SHELL CLAM MANAGEMENT OBJECTIVES

Until the late 1980s, the management planning process for the clam fishery was less structured and regimented than it was for other fisheries. Widespread access to the many open clam beds in the Scotia-Fundy Region made it difficult to introduce a comprehensive management regime that gave equitable treatment to the numerous individuals who participated in the fishery. Recently, DFO has committed itself to the introduction of a Region-wide management plan. In consultation with industry and clam diggers' associations, the Department has made a major effort to introduce management measures that ensure the long-term conservation of the resource while allowing for an economically viable fishery. There are six general themes that guide the planning process for this fishery.

1. Conservation and Protection

Biological data on recruitment patterns and stock levels on the soft shell clam species are incomplete. No precise information is available by fisherman to determine what level of fishing effort can be tolerated. What is clear is that the general fishing effort has increased in recent years and clam yields per individual have declined.

DFO stresses that the fishing effort should not reach a level that affects the stability and survival of the clam beds. It is for this reason that a Region-wide minimum shell length of 1 3/4 inches (44mm) will be introduced by 1990. All clam diggers, both recreational and commercial, will be affected by the new size. As well, the use of a commercial licensing policy and designated management areas will contribute to the conservation of the resource. Management measures, designed to control and monitor fishing effort in the clam fishery are under review by DFO, industry representatives and clam diggers.

2. Economic Viability

Since the mid-1980s, higher prices for exported clams and expanding markets in the United States have sparked substantial interest in the clam fishery. The result has been a wider distribution of revenues among clam diggers. Commercial diggers who have traditionally depended on the fishery for a portion of their annual income must now compete with others who have entered the fishery to exploit recent market opportunities. Some fishermen are wholly dependent on revenues from the soft shell clam fishery. DFO, in consultation with various clam digger associations, is now considering policy objectives that may provide controlled access, subject to sound biological advice, to the clam beds for commercial fishermen most dependent on revenues from this fishery while taking into account the long standing recreational aspect of the fishery.

3. Public Health

Soft shell clams are vulnerable to paralytic shellfish poisoning (PSP), domoic acid, chemical, bacteriological and virus contamination. The consumption of contaminated clams constitutes a threat to public health. DFO stresses that current and pending management and inspection regulations are designed to prevent the harvesting and processing of such clams. The development of the clam fishery will be strictly guided by public health concerns. No relaxation of inspection standards, as requested by some industry members, will be considered.

4. Habitat Management

Government, industry and clam diggers recognize the need to stabilize, develop and enhance the shellfish habitat. The objective here is to ensure the widespread availability of harvestable clam beds. To this end, the control of pollution affecting the clam beds and the revitalization of contaminated areas is an ongoing priority of DFO.

DFO is working with other federal and provincial agencies to introduce education and information programs on shellfish growing areas; to reviewing existing data on shellfish and recommending resource development projects and sanitary and water quality survey priorities; and to monitoring progress in the development of programs to eliminate or prevent pollution of shellfish growing areas and encouraging corrective action for specific problem areas. For example, Chamcook Harbour Project in southwestern New Brunswick was started in January, 1989. The objective of the program is to regain clean waters in Chamcook Harbour. More generally, DFO is actively involved in solving the problem of coastal pollution affecting clam harvesting areas. The three area advisory committees (see The Consultative Process, this document) in the Scotia-Fundy Region are looking at ways to handle local fecal coliform contamination problems.

5. Data Collection and Biological Review

DFO needs more catch and landing data from clam diggers. Incomplete information impedes DFO's ability to develop a comprehensive management plan. Biological assessment of the clam beds is impaired as well. Biologists use landing and catch data, in part, to determine recruitment patterns, stock stability and mortality levels among clams. DFO stresses that a new data collection and statistical regime for the soft shell clam industry is required to ensure that new management measures are founded on sound scientific knowledge. For 1988-92, DFO has committed substantially more resources to the biological investigation of the soft shell clam resource.

6. Five Year Clam Enhancement Program

DFO has responded to clam diggers' requests for more biological research by initiating a five-year clam enhancement program (1988-1992). The program will study what pressures affect the reproduction capacity of the clam beds and it will look at ways to improve clam production. Information from the program will be a key element in the management process for this fishery. The resources needed for this program represent a major expenditure for DFO. (For more information see Summary of Current Issues, this document).

1989 SOFT SHELL CLAM MANAGEMENT MEASURES

DFO is in the process of consolidating the Nova Scotia Fishery Regulations, the New Brunswick Fishery Regulations, the Prince Edward Island Fishery Regulations, the Nova Scotia Tidal Waters Boundary Order and the New Brunswick Tidal Waters Boundary Order. This rewrite will be called the "Maritime Provinces Fishery Regulations" (MPFR). The rewrite will reorganize and clarify the provisions of the provincial regulations, eliminate antiquated provisions, expand on the number of closed times for species and gear types and include amendments developed over the past three years. Issues such as variation of closed times, marking of fishing gear, marking of fishing vessels, licensing, conditions of licences and regulations and release of prohibited fish will be addressed in a national set of regulations to be entitled the "Fishery (General) Regulations" (F(G)R). The introductions and transfers of fish will be incorporated in the Fish Health Protection Regulations. The topic of contaminated and toxic shellfish areas will be dealt with in a set of national regulations to be called the "Management of Contaminated Fisheries Regulations" (MCFR). These regulations are expected to become law in 1990. The soft shell clam fishery will be subject to the commercial licensing policies set out in this consolidation, and a Region-wide minimum shell length requirement of 44mm will come into effect.

The following regulations are identified in the Nova Scotia Fishery Regulations and apply to Southwestern Nova Scotia and Eastern Nova Scotia. It should be stressed that the following are existing regulations only, and pending regulations affecting the soft-shell clam fishery will be cited when they have passed through the full regulatory process in 1989-90.

1. For the purposes of this section, clams include soft shell and long neck or squirt clams, bar clams and quahaugs.
2. a) No person shall fish for, take, have in his possession, or sell any bar clams the length of the shell that is less than 75 mm, measured in a straight line.
b) No person shall fish for, take, have in his possession, or sell any clam the length of the shell that is less than 5 cm, measured in a straight line--except in the Counties of Yarmouth, Digby, Annapolis, Kings, Hants, Colchester and Cumberland.

3. No person shall retain any clam the length of the shell of which is less than that specified in subsection (2) for a longer time than is necessary to measure.
4. Subject to subsection (3), any person who has in his possession a clam the length of the shell of which is less than that specified in subsection (2) shall return it immediately to the waters of the area from which it was taken.
5. No person shall fish for clams except with hand tools or with a hydraulic or mechanical device approved by the Minister.
6. No person shall fish for clams with a hydraulic or mechanical device except under a licence.
7. No licence to operate a hydraulic or mechanical device shall be granted unless the Minister is satisfied that its operation will not interfere with other methods of fishing.
8. No person shall operate a hydraulic device except in the area and during the period of time specified in his licence.
9. No person shall fish for quahaugs in any waters where oysters are fished except in areas that have been set aside and marked for that purpose by a fishery officer.

The following regulations are identified in the New Brunswick Fishery Regulations and apply to Southwestern New Brunswick.

1. For the purpose of this section, clams include soft shell and long neck or squirt clams, bar clams and quahaugs.
2. No person shall take or have in his possession any clam other than bar clam, the shell of which is less than 38 mm in length measured in a straight line. (Bar clams are not to be less than 75 mm.)
3. In fishing for clams in any area, no person shall retain any clam that is less than the legal size for that area for any period longer than is necessary to measure it and then he shall return it immediately to the area from which it was taken.
4. Notwithstanding subsection (2), soft shell clams of a length less than that specified therein may be taken, had in possession or sold if taken in an area that the Minister has designated as overpopulated.

5. No person shall fish for clams except with tools or with a hydraulic device approved by the Minister.
6. No person shall fish for clams with a hydraulic device unless he has a licence.
7. No licence to operate a hydraulic device shall be granted unless the Minister is satisfied that its operation will not interfere with other methods of fishing.
8. No person shall operate a hydraulic device except in the area and at the time specified in his licence.
9. No person shall fish for quahaugs in bays, harbours and other waters where oysters are fished except in areas that have been set aside and marked for that purpose by a fishery officer.

HISTORICAL OVERVIEW

Early records and archaeological evidence indicate that the Indian population indigenous to the Maritimes highly prized the soft shell clam for food and jewelery. Later records show that early settlers also depended on the abundant clam stocks to subsidize their diets. Clams have also been used as bait, fertilizer, ornaments, dishes and currency.

In the mid-1800's, clams were harvested and preserved in brine to supply Grand Banks fishermen with salt bait for the cod, mackerel and halibut fisheries. Over the years, a more general and domestic usage and marketing of soft shell clams developed. The soft shell clam has been commercially harvested from at least the turn of the century and some catch data have been maintained since 1918. Commercial landings have fluctuated markedly over the years, primarily in response to fishing effort and market value. Landings for the Maritimes peaked at 10,526 t in 1950 and declined throughout the 1960's and 1970's.

The first clam processing plant in the Minas Basin region was constructed in 1905. Located along the North River in the community of Five Islands, it employed six diggers. In 1910, the factory, destroyed by fire, was replaced by a newer facility. Most processed clams were shipped to American markets. By 1941, the factory employed 50 workers. Processing facilities continued to expand up to 1948. In 1948, prices for clams dropped significantly, markets began to contract and total clam landings declined. The number of fishermen participating in the Minas Basin fishery dropped from an average of 100 diggers to between 20 and 70 for the following two decades.

In 1967, the law prohibiting the shipment of clams in the shell was abolished. This annulment allowed live clams to be exported. By the end of the decade, the transition from a canned product to fresh, shucked clams had occurred in response to the American deep-fried trade. A market for clams in the shell was developed, as well. Prices increased rapidly as markets grew, and landings and the number of diggers increased.

Recent landings have indicated an upward trend, with a peak of 4,517 t in 1986. The landings were valued at \$5.6 million. While clam harvesting in the Scotia-Fundy Region takes place along many inlets and estuaries, the fishery tends to be concentrated in three areas--the Annapolis Basin, southwestern New Brunswick and the Upper Bay of Fundy region (Minas Basin).

A substantial number of clam flats are "closed" to commercial and recreational fishing due to bacteriological contamination and paralytic shellfish poisoning (PSP). Areas affected by bacteriological contamination are closed for extended periods, while PSP closures vary annually.

FISHERY PROFILE

The soft shell clam is an important fishery resource in the Scotia-Fundy Region. Clam digging in the Scotia-Fundy Region is concentrated mainly in the Bay of Fundy area. Landings in eastern Nova Scotia are small relative to other areas in the Region, though significant fluctuations take place. Clam diggers fall into three categories--full-time commercial fishermen, part-time commercial fishermen and recreational participants. Since no fishing licence is currently required to dig clams, no precise employment estimates are available. General estimates suggest that approximately 1,000 to 1,200 clam diggers are very active in the Scotia-Fundy Region, though twice this number may participate in the fishery sporadically. Total employment in the southwest New Brunswick clam fishery amounts to between 700 to 750 fishermen and plant workers. There are currently 16 clam processing plants and buying stations located in southwest New Brunswick. In the entire Scotia-Fundy Region, about 50 clam buyers are active. Approximately 600 to 700 clam diggers are scattered throughout Nova Scotia, with the majority concentrating their efforts in the Annapolis Basin and along the Five Islands and Economy Point shores of the Minas Basin.

The harvesting methods used in the clam fishery have remained relatively unchanged. Fishermen, using a clam hoe or hack and containers, follow the receding tide to dig clams. Fishermen coordinate their effort to correspond with the mid and low tides of the day, giving them roughly four hours of fishing per tide.

In southwestern New Brunswick, three depuration plants are active. Depuration is a process where bacteriologically contaminated clams are placed in containers through which purified salt water is pumped. The process must be conducted in compliance to a strict set of operational procedures and each lot of clams is evaluated for microbiological quality. In the Minas Basin area, there are three processing plants which employ 20 to 25 workers. Other processing facilities are located in Digby and Annapolis Counties. In Nova Scotia, there are 30 facilities currently registered for the export of clam products to the U.S. and approximately 10 provincially licensed facilities selling only in Nova Scotia.

In recent years, the value of landed clams has exceeded the landed values of other notable fisheries, namely squid, gaspereau, salmon, mackerel and snow crab. The greatest increase in clam landings and revenues has been recorded in Southwestern New Brunswick. In addition, the unknown monetary worth of private clam sales and recreational digging benefits the provincial economies of Nova Scotia and New Brunswick. Expanding and lucrative markets will continue to stimulate interest in this growing fishery. Additionally, the industry contributes to the provincial economy as a result of seasonal participation by tourists in this fishery.

Table I: Landings of Clams - Scotia-Fundy Region - 1984 to 1988
(Quantity (Q) in tonnes; Value (V) in thousands of dollars)

Clam	1984		1985		1986		1987		1988	
	Q	V	Q	V	Q	V	Q	V	Q	V
Bar	-	-	-	-	21	14	-	-	-	-
Soft	3,707	3,259	3,896	4,130	4,517	5,664	3,966	5,045	2,086	2,322
Shell										
Razor	2	1	2	1	-	-	-	-	-	-
Unspec- ified	5	7	7	11	7	6	-	-	-	-
TOTAL	3,714	3,267	3,905	4,142	4,545	5,684	3,966	5,045	2,086	2,322

From 1984 to 1988, clam landings have averaged 3634 t. The value of the clam catch has averaged \$4.1 million. In 1982, landings in eastern Nova Scotia accounted for 12 percent of the total catch, western Nova Scotia for 60 percent and southwestern New Brunswick for 28 percent. For 1982, the value of landings in eastern Nova Scotia represented 10 percent of the total, 61 percent in western Nova Scotia and 29 percent in southwestern New Brunswick. In 1987-88, landings in eastern Nova Scotia accounted for 4 percent of the total catch, western Nova Scotia for 39 percent and 57 percent in southwestern New Brunswick. For 1987-88, the value of the clam catch in eastern Nova Scotia represented 4 percent of the total, 49 percent in western Nova Scotia and 47 percent in southwestern New Brunswick. (These statistics are based on reported landings only.)

CONSULTATIVE PROCESS

The clam fishery in the Scotia-Fundy Region is segmented into three general areas for management purposes--southwestern Nova Scotia, eastern Nova Scotia and southwestern New Brunswick. Management initiatives for each region are deliberated and developed by advisory committees. These committees, sponsored by DFO, are made up of representatives from DFO, industry clam diggers, the provincial governments of Nova Scotia and New Brunswick and other observers as necessary. In turn, the advisory committees are supported by a working group of DFO officers who consolidate economic, biological, marketing and other information into draft management initiatives. Sub-committees and various working groups can be set up to address specific issues.

In September 1987, DFO sponsored a three-day soft shell clam workshop in Truro, Nova Scotia to consider the introduction of a management plan for this fishery. Representatives from government, industry and clam diggers associations identified their preferences for new management measures. In particular, commercial clam diggers called for the introduction of a Bay of Fundy-wide minimum size restriction on landed clams (1 3/4", with a possible upward revision to 2"), and a daily possession limit for recreational diggers (300 clams). In addition, the introduction of a limited-entry licensing regime was requested with the development of guidelines to limit commercial access to those fully dependent on the resource for their livelihood. More biological research was asked for, and the need for adequate administrative and enforcement resources to implement any new management measures was stressed. DFO noted that the introduction of new regulations must proceed cautiously, given the many demands on existing enforcement resources. Industry members requested a relaxation of international standards governing PSP and bacterial contamination closures to allow for greater use of clam resources from marginally contaminated areas. DFO rejected such a relaxation, arguing such standards are needed to protect public health, satisfy international commitments, and ensure market acceptance of Canadian clam products.

A second soft shell clam workshop was held at the end of August, 1988 in Saint John, New Brunswick. Among the issues discussed were what principles and guidelines should be used to design a limited entry licensing policy for the soft shell clam fishery; appropriate licensing and possession requirements for recreational diggers were discussed and industry called for expanded biological assessment of the Scotia-Fundy clam resource. Industry requested the creation of a Regional Soft Shell Clam Advisory Committee, chaired by the Regional Director of Fisheries and Habitat Management. This Committee had its first meeting in the fall of 1988, and reviewed the various management proposals coming out of the summer workshop. Industry was dissatisfied with the pace at which size limits and licensing regulations were being introduced. DFO stressed that the regulatory process is lengthy and complex. DFO will continue to push for speedy implementation of these regulations. Industry registered concern about the extent of coastal sewage pollution and the increasing loss of productive clam beds. DFO is committed to working with appropriate government agencies, in consultation with industry, to develop strategies for addressing local pollution problems.

At the August workshop the possibility of three soft shell clam management areas for Nova Scotia was raised. Area I would cover the Upper Bay of Fundy from Cape Split to New Brunswick; Area II would involve western Nova Scotia from Cape Split around to Jeddore Cape; and Area III would be from the eastern shore of Nova Scotia and Cape Breton from Jeddore Cape to Cape Breton. The use of management areas may be necessary if specific fishing restrictions are recommended and introduced for a localized area. The issue will require further review to determine if the boundaries are consistent with traditional fishing patterns and meet the needs of clam diggers.

SUMMARY OF CURRENT EVENTS

Government, industry and fishermen are dedicated to establishing a long-term management regime for the clam fishery. Recent increases in fishing effort and the number of participants have highlighted the need to properly manage this fishery. Among the issues requiring review and resolution:

1. Conservation and Protection

Clam harvesting methods can do significant biological damage to the clam flats. The increasing number of clam diggers participating in this fishery has brought forth concerns that current exploitation rates may be contributing to stock declines. Clam diggers have reported that, despite the same level of fishing effort, individual landings are declining. DFO and industry members recognize the need to implement management measures that adequately conserve and protect the resource. Among the available options are:

- (a) leasing, by which clam diggers would temporarily rent clam beds;
- (b) rotational digging, clam diggers would restrict their harvesting activities to specific clam beds for specified time periods;
- (c) re-seeding, clams from uncontaminated beds would be used to seed other clam beds in an effort to increase the available stock;
- (d) area closures, harvesting would be prohibited in clam beds where exploitation rates had reached unacceptable levels;
- (e) the introduction of Region-wide size limits;
- (f) the use of seasonal closures to protect clam beds during their reproduction periods;
- (g) restrictions on the amount of clams that can be harvested by recreational and commercial diggers; and
- (h) other efforts to reduce the overall fishing effort.

The introduction of new management procedures will be closely tied to detailed consultation with clam diggers' associations and industry members. DFO and industry members agree that new management measures should not be implemented until the necessary administrative and enforcement resources are available.

2. Paralytic Shellfish Poisoning (PSP)

Bivalves, including clams, which are filter feeders, feed on a minute poisonous marine organism called Gonyaulax excavata, especially during the warm summer months when the organism multiplies and becomes very abundant. Humans consuming such clams can become seriously ill and if the contamination is sufficiently high, death can result. In the Scotia-Fundy Region, PSP content in clams has been largely limited to the lower Bay of Fundy.

In order to protect public health, DFO has a comprehensive PSP Monitoring and Control Program in effect. Samples are regularly taken at key sites in areas prone to PSP outbreaks, and once toxin concentrations in the shellfish rise to unsafe levels, the affected shellfish harvesting areas are closed. DFO advises that a rigid, comprehensive inspection program is necessary to ensure that no PSP-contaminated clams are harvested.

DFO's inspection labs provide timely and accurate reports on the presence of PSP. Most recently, low levels of domoic acid have been found in shellfish in the Bay of Fundy. A comprehensive monitoring system for domoic acid is now in place. Major testing facilities are located in Black's Harbour, New Brunswick and Halifax, Nova Scotia. Industry members have called repeatedly for the expansion of testing facilities. They want a mouse bioassay laboratory set up in Southwestern Nova Scotia. The expanded facilities, they argue, will speed up the inspection and handling of clams. DFO advised that its current resources do not permit this expansion.

3. Depuration Facilities

Industry continues to express interest in depuration, primarily as a means to maintain, and, where possible, to increase production, as many open areas have been depleted. Depuration applies only to clams affected by bacteriological contamination and not PSP. The Region currently has two operating depuration plants. DFO and industry resource investment in these operations has been substantial. Industry members do not realize the very rigorous harvesting, processing and analytical testing, monitoring and control programs necessary for each of these operations in order to ensure that the public health is protected, and since most depurated clams go to American markets, that the United States Food and Drug Administration (USFDA) must be satisfied that plants of these types continue to meet National Shellfish Sanitation Program requirements.

4. Clam Fishery and Annapolis Valley Tidal Power Plant

Clam fishermen and diggers have registered concern about the potential impact the Annapolis Tidal Generating Plant has had on clam beds. Clam diggers' associations charge that the plant's presence has accelerated erosion of farmlands along the Annapolis River, and harmful silt and chemicals may also be affecting the clam beds in the Basin. Clam diggers argue that clam beds have been severely damaged. Existing biological

data does not conclusively demonstrate a link between diminishing clam populations in the Annapolis Basin and the operation of the tidal power plant. DFO advises that following the completion of current research examining the relationship between the clam beds and the tidal power plant, appropriate responses to the clam diggers concerns will be proposed. A special study group has been set up to examine sedimentation in the clam producing areas of the Annapolis Basin, and to review the extent and probable cause of reduced clam yields and mortalities.

5. Biological Input and Assessment

The biological data base for the soft shell clam resource is incomplete. A more detailed understanding of recruitment patterns, mortality levels, and the age and growth rate of clams will be necessary if new management measures are to be guided by sound and timely biological advice. DFO recognized this gap and is committed to improving scientific assessment of the clam resource. Currently, a large number of clam producing areas are under study by DFO. A number of research projects within the Mollusc Shellfish Toxic Science Program have been implemented. Information will be needed, as well, on the impact a single size limit will have on the clam population over the long term, on where stunting and low growth areas will occur, and on the impact of harvesting practices that result in high mortality rates, such as selectively digging for a specific size.

6. Reporting of Clam Landings

Landings by full-time, recreational and part-time clam diggers have increased markedly in recent years. Precise data, though, on catch rates and effort are not available, given that clam landings do not have to be reported. Still, recreational and part-time digging can have a determining impact on existing clam resources and influence the availability of commercial landings and revenues. DFO and industry members recognize the need to introduce a reporting system that will document accurately soft-shell clam landings and catch rates.

7. Five Year Enhancement Program for Soft Shell Clam Fishery

DFO is committed to a five year enhancement program (1988-92) that will lead to increases in soft shell clam productivity and expansion of the resource base. The Plan will also evaluate the positive and negative impacts of current harvesting practices and identify sources of habitat degradation and/or pollution that result in the closure of clam flats. The Plan will proceed in three phases. Phase I will involve collection of data to determine the impact of harvesting practices and other forms of physical habitat degradation on the clam resource. Phase II will evaluate and test possible enhancement techniques such as seeding, brushing, harrowing, spat collection and hatchery development. Phase III will see the full implementation of enhancement projects. The increasing pressures on the clam resource from pollution, harvesting, other forms of habitat degradation and environmental changes from other habitat users, underscores the timeliness of the enhancement program.

10. Pollution of Clam Beds

Industry and clam diggers have expressed concern about the extent of coastal sewage pollution and the increasing loss of productive clam beds. They want government agencies to move against municipalities that dump raw or inadequately treated sewage. DFO is committed to discussions with other agencies that could lead to clean-up of productive clam areas. This issue will be reviewed by the Region-wide Advisory Committee and the local advisory committees. Industry has said that the introduction of the comprehensive management plan will be undermined if the pollution problem is not remedied quickly.

Proposed Licensing Policy

(See Section II, 1988 Soft Shell Clam Management Measures.)

All persons digging soft-shell clams commercially must have a licence (subject to availability of regulations).

Limited licensing will apply in 1990 with slightly varying eligibility guidelines by management area. The specific differences among the management areas are under review by the soft-shell clam advisory committees. For example, the number of weeks an individual needed to dig clams to qualify as a full-time commercial fisherman after the first year of the commercial licensing policy could depend on the availability of clams in a particular management area.

Only commercial fishermen will be allowed to sell soft-shell clams.

Individuals who are younger than 16 years will have open access to the soft-shell clam fishery.

No licence will be required for recreational digging, though a daily possession limit may be put in place.

Scotia-Fundy Soft-Shell Clam Advisory Committee Membership

Name	Affiliation	Location
N. Bellefontaine (Chairman)	DFO	Halifax
Commercial Clam Diggers		
R. Bellefontaine	Chezzetcook Clam Diggers Association	Porters Lake
K. Pye	Sonara	Sonara
C. Edwards	Digger	Joggins Bridge
J. Webb	Digger	Upper Economy
R. Power	Digger	Lower Five Islands
D. Bent	Digger	Lepreau
L. Foster	Digger	St. Andrews
M. Newman	Digger	Deer Island
Buyers/Processors		
B. Wood	Lepreau Seafoods Ltd.	Lepreau
D. Mills	Northern Clam Ltd.	Campobello Island
S. Russell	Woodwards Cove	Grand Manan Island
B. Ford	Ford Fisheries	St. Bernard
J. Roberts		Advocate
D. Stanton	Daves Clams	Port Wade
Municipal Association		
B. Thompson	Saint John Fundy Regional Dev. Commission Inc.	Saint John
Provincial Governments		
M. Janowicz	N.B. Dept. of Fisheries and Aquaculture	Fredericton
J. Choate	N.B. Dept. of Municipal Affairs and Environment	Fredericton
G. Roach	N.S. Dept. of Fisheries	Halifax
R. Fitzner	N.S. Dept. of Environment	Halifax
Federal Government		
K. Hamilton	Department of Environment	Dartmouth
Department of Fisheries and Oceans		
G. Jefferson	DFO	Halifax
F. Allen	DFO	Sydney
F. Libby	DFO	Yarmouth
D. Doncaster	DFO	Blacks Harbour
P. Fahie	DFO	Halifax
T. Rowell	DFO	Dartmouth
S. Robinson	DFO	St. Andrews

Southwest Nova Scotia Clam Advisory Committee Membership

Name	Affiliation	Location
F. Libby (Chairman)	DFO	Yarmouth
G. Roach	N.S. Dept. of Fisheries	Halifax
J. Hansen	N.S. Dept. of Fisheries	Halifax
J. Robarts	Processor	Advocate Harbour
N. Lasch	Municipality of Annapolis Co.	Annapolis Royal
B. Ford	Processor	St. Bernard
C. Edwards	Basin Clam Diggers Association	Digby
D. Stanton	Processor	Annapolis Royal
T. Wilkins	Basin Clam Diggers Association	Digby
A. Ford	Processor	Weymouth
A. Wilkinson	Fisherman	Digby
Cormier	Fisherman	Five Islands
C. Robichaud	Fisherman	Belliveau's Cove
R. Saulnier	Processor	Weymouth
J. Webb	Processor	Upper Economy
R. Power	Fisherman	Lower Five Islands
T. Weekes	Fisherman	Annapolis Royal
M. Tugwell	Acadia University	Wolfville
M. Fisher	Fisherman	Digby
J. Milner	Fisherman	Granville Ferry
C. Comeau	DFO	Yarmouth
D. Pezzack	DFO	Halifax
G. Jefferson	DFO	Halifax
R. Sweeney	DFO	Halifax
D. McClafferty	DFO	Digby
T. Rowell	DFO	Dartmouth
S. Robinson	DFO	St. Andrews

Southwest New Brunswick Clam Advisory Committee Members

<u>Name</u>	<u>Organization</u>	<u>Location</u>
D. Doncaster (Chairman)	DFO	Blacks Harbour
J. Benson	Helshiron Fisheries	Seal Cove
C. Cook	Little Rock Fisheries	Seal Cove
L. Cooke	Cooke's Shellfish	St. George
O. Duplessis	Buctouche Fish Market	Buctouche
K. Foster	Mills Sea Foods Ltd.	Bocabec
L. Foster	Western Charlotte Clam Diggers Association	St. Andrews
R. Green	Green Sea Products	Grand Harbour
N. Green	M.G. Fisheries Ltd.	Grand Harbour
M. Janowicz	N. B. Dept. of Fisheries and Aquaculture	Fredericton
J. Ingersoll	J.L. Ingersoll and Sons	Woodwards Cove
L. Landry	Chamcook Seafoods Ltd.	Chamcook
C. Leavitt	Larry's Shellfish & Seafood	Backbay
C. Lomax	Lomax Enterprises Ltd.	Lepreau
D. Mills	Northern Clam Co. Ltd.	Campobello
G. Mills	Mills Sea Food Ltd.	Buctouche
P. Mitchell	Digger	Lepreau
L. Pendleton	Pendleton Fisheries Ltd.	Deer Island
H. Russell	Hovey Russell & Sons Ltd.	Woodwards Cove
L. Spear	Lepreau Clam Diggers Association	Lepreau
P. Williamson	Robicheau's Fish Market	St. Andrews
B. Wood	Lepreau Seafoods	Lepreau
T. Mitchell	Digger	Lepreau
D. Bent	Fisherman	Maces Bay
D. Brown	DFO	St. Andrews
S. Robinson	DFO	St. Andrews
C. Schom	DFO	St. Andrews

Eastern Nova Scotia Soft-Shell Clam Advisory Committee

<u>Name</u>	<u>Organization</u>	<u>Location</u>
F. Allen (Chairman)	DFO	Sydney
G. Roach	N. S. Department of Fisheries	Halifax
D. Hansen	N. S. Department of Fisheries	Halifax
R. Bellefontaine	Chezzetcook Clam Digger's Association	Porters Lake
G. Bonang	Chezzetcook Clam Digger's Association	West Chezzetcook
C. Porier	The Chezzetcook Committee	West Chezzetcook
K. Pye	Sonara/Wine Harbour Clam Digger's Association	Sherbrooke
C. Randall	County of Halifax	Head Chezzetcook
G. Jefferson	DFO	Halifax
D. Kelly	DFO	Halifax
R. Filon	DFO	Musquodoboit
J. Nelson	DFO	Halifax
T. Rowell	DFO	Dartmouth

Information on Canadian Clam IndustryHarvesting and Processing

The fall in clam landings in the Scotia-Fundy Region from 1987 to 1988 has meant an increase in imports from New England to meet consumer demand. The decline in supply, though, has not meant an increase in prices. More generally, the supply and demand of soft shell clams, and therefore prices, are in a period of uncertainty. Overdigging may have contributed to the fall in landings in the Region. New England landings from 1989 are expected to be lower than in 1988. The combination of area closures, warm weather and overfishing will contribute to this decline. However, bumper crops from Maryland will keep supply high and prices relatively low. The move to a 2 inch minimum shell length requirement with a five percent tolerance limit in New England may not have a significant impact on Canadian exports of soft shell clams to the United States.

Traditionally, markets for Canadian clam products have been identified within the United States and Japan where domestic clam resources cannot supply increasing market demands. The primary market is New England. The clam catch for commercial purposes is delivered live to the appropriate plant where it is shucked, cleaned and processed into fresh or frozen products.

Clams are shucked or processed in various plants throughout the Scotia-Fundy Region. Specifically, plants are located in Digby County and Annapolis County Nova Scotia, and in Dipper Harbour, Chamcook, Back Bay, Bocalec, Lepreau and Welshpool, New Brunswick. A clam fishery has recently developed on Grand Manan with several federally registered plants on the island. Clam products are processed in two forms, frozen (clam meats, breaded and canned) and fresh (clam meats and in the shell). For 1986, DFO estimates that approximately \$10 million worth of soft shell clams harvested in the Scotia-Fundy Region were processed in various forms. In the Scotia-Fundy Region, processed clam products include fresh clam meats, small amount of frozen breaded clam products and frozen clam meats. Large quantities of soft shell clams harvested in the Scotia-Fundy Region are trucked to New Brunswick, where they are processed (meats and in-shell) by plants in the Gulf Region.

Table II: Atlantic Coast Clam Landings by Province & Region (All Species, Product Weight) - 1984 to 1988 (Quantity (Q) in tonnes; Value (V) in \$000)

Province	1984		1985		1986		1987		1988	
	Q	V	Q	V	Q	V	Q	V	Q	V
Nova Scotia	1,791	1,546	1,496	1,628	1,926	2,710	1,495	2,304	3,777	3,604
New Brunswick	2,829	2,909	2,540	2,576	3,092	3,537	2,257	2,390	1,402	1,496
Pr. Edward Isl.	1,121	697	130	67	465	494	-	-	475	438
Quebec	623	413	737	472	877	653	504	622	613	619
Newfoundland	0	0	0	0	1	1	-	-	-	-
Total	6,364	5,565	4,903	4,743	6,361	7,395	4,256	5,316	6,267	6,157

Table III: Canadian Exports of Clams (All Species, Product Weight) (Fresh or Frozen) - 1983 to 1987 (Quantity (Q) in tonnes; Value (V) in \$000)

Country	1983		1984		1985		1986		1987	
	Q	V	Q	V	Q	V	Q	V	Q	V
U.S.	3,654	11,577	3,777	13,888	4,722	19,661	4,879	22,775	4,805	19,357
Japan	406	2,669	397	2,872	602	4,378	495	3,717	629	6,396
Other	131	441	1,153	16	719	2,880	652	3,262	1,040	5,537
Total	4,191	14,246	5,327	16,776	6,043	26,919	6,026	29,754	6,474	31,290

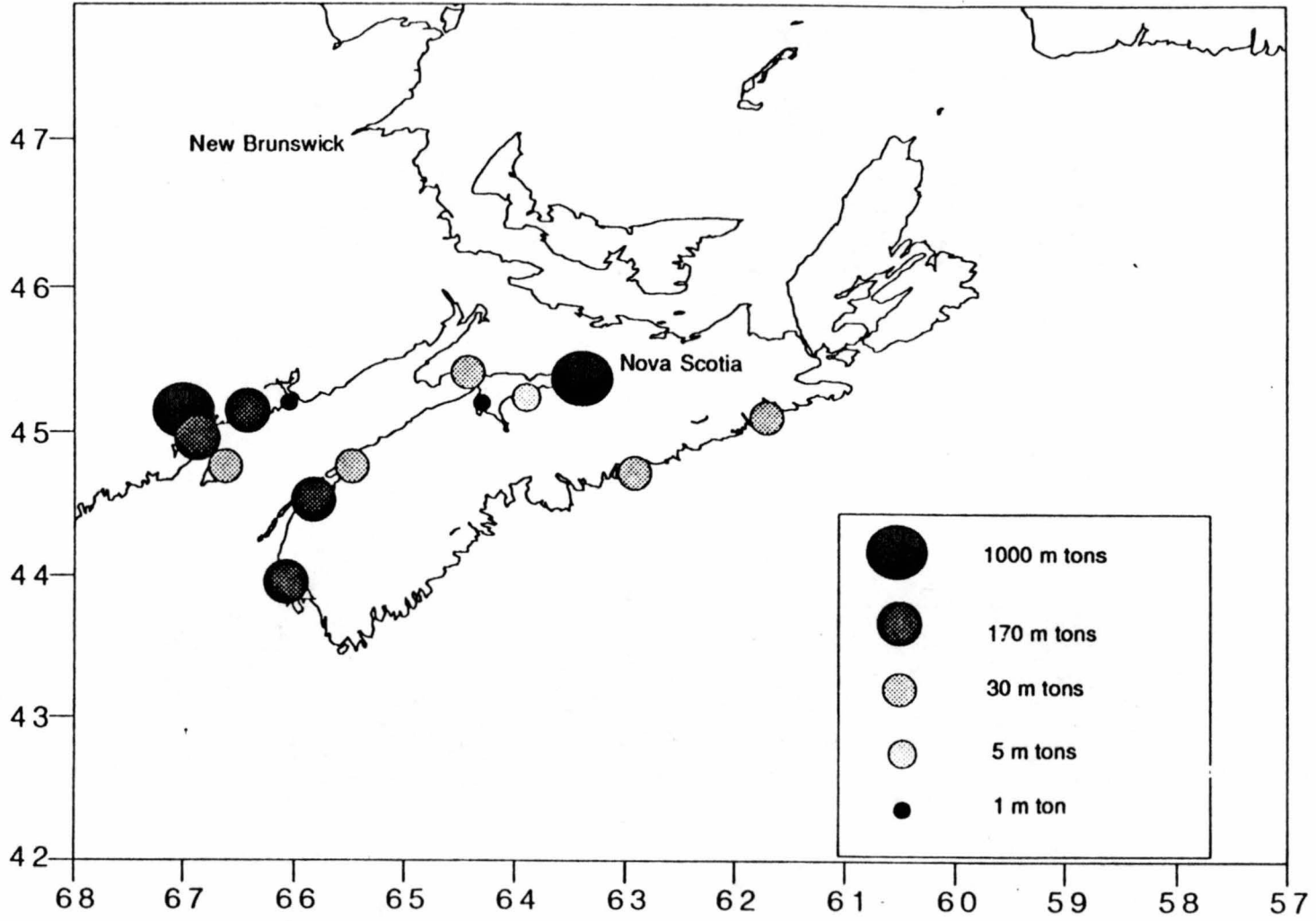
Exports of clams have increased in volume by 24 percent from 1983 to 1987 and by 40 percent in value. In 1987, exports to the United States accounted for 74 percent in volume and 62 percent in value. Japanese markets have accounted for 10 percent of volume and 19 percent of value in 1987.

Table IV: Canadian Import of Clams (All Species, Canned Product Weight) - 1983 to 1987 (Quantity (Q) in tonnes; Value (V) in \$000)

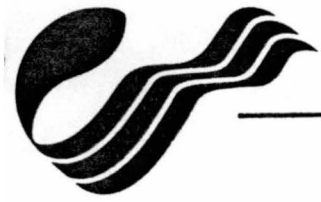
Country	1983		1984		1985		1986		1987	
	Q	V	Q	V	Q	V	Q	V	Q	V
Thailand	638	1,691	2,176	5,922	2,385	5,066	2,206	3,919	1,595	4,750
Malaysia	-	-	-	-	229	395	287	444	737	2,137
Japan	1,183	3,453	876	2,761	155	449	8	17	-	-
South Korea	219	712	-	-	-	-	-	-	-	-
Other	324	899	612	1,895	173	563	257	744	434	1,442
Total	2,364	6,755	3,664	10,578	2,942	6,473	2,758	5,124	2,766	8,327

From 1983 to 1987, Canadian clam imports have ranged from 2,300 t to 3,600 t; the value of the imports has varied from \$5 million in 1986 to \$10 million in 1984. On average, 2,899 t of clams have been imported for the last five years; the value of the imports, on average, was \$7.2 million.

Imports from Thailand have represented 55 percent of the total from 1982 to 1987. Clam imports from Japan have declined steadily from 1983 to 1987.



Distribution of Significant Clam Landings - Scotia-Fundy Region 1986



BACKGROUNDER

FIGHE d'INFORMATION

March 9, 1989

STEPS TAKEN BY DFO TO IMPROVE SOFT-SHELL CLAM INDUSTRY

The clam industry of New Brunswick and Nova Scotia and the Department of Fisheries and Oceans (DFO) are drawing up a commercial licensing program and are working together on an enhancement project to upgrade the quality and quantity of clams. Both of these programs are designed to protect the resource and to put the clam fishermen (diggers) on a professional level.

In recent years the soft-shell clam industry had suffered from its own success. The rising popularity of this shellfish increased the danger of overharvesting, and in some areas clam flats are threatened with pollution.

"It's one of the least managed fisheries in Canada," says Glen Jefferson, Senior Advisor, Invertebrates Fishery. "That's one of the reasons why the clam industry has asked the government to implement a management and development program."

In 1987 the first DFO Soft-Shell Clam Workshop was held in Truro, N.S. This meeting brought government officials, clam diggers, and processors together to work towards developing an enhancement program and the establishment of a licensing system for commercial diggers.

In August of last summer ('88) a second workshop was held in Saint John, N.B. to further discuss these plans. Clam diggers expressed their concerns about the present overfishing and recommended that all persons digging clams commercially should have licences, and that the licences should be limited in 1990 with eligibility guidelines. The purpose of the commercial licensing program is to limit participation in the industry to those persons who are dependent on the fishery for their livelihood, and to make diggers a more professional group.

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Industry representatives specifically recommended that licensing programs be implemented in the Upper Bay of Fundy from Cape Split to New Brunswick (shellfish area 20), Western Nova Scotia from Cape Split around to Jeddore Cape (shellfish areas 12 - 19), and the Eastern shore of Nova Scotia and Cape Breton from Jeddore Cape to Cape North (Shellfish Areas 6 - 11). DFO officials are examining the clam fishermen's proposals in detail and will work out the specifics in consultation with advisory committees.

A five-year enhancement program was planned to increase the quantity of clams harvested and increase the incomes of those participating in this fishery. With \$180,000 allocated for the 88/89 fiscal year, biologists have begun to evaluate the impact of different harvesting methods, identify sources of pollution or habitat degradation, and test techniques to increase the number of clams available for harvesting such as seeding, brushing, harrowing, spat collection, and grow out.

Another initiative from the industry brought to these meetings was the implementation of a minimum shell-size limit of 1.75 inches which will also allow the clams to grow before being harvested.

Clams have always been popular in the Maritimes and this popularity has spread to other parts of Canada and to the United States. Though prices have leveled off in the past year, the greater demand for clams experienced by the industry had caused a price hike. As market interest grew, the number of diggers climbed to about 1200. More diggers meant more competition for the resource. Over the past five years reported clam landings have increased from 3,300 mt to 5,700 mt, an increase of nearly 70 per cent.

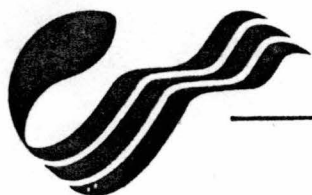
The increased number of diggers, many unprofessional and without experience, has increased the need for regulation to help prevent overharvesting or sale of contaminated clams. Licensed professional diggers will have a bigger stake in protecting their own industry and the health of the consumer.

Under the provisions of the Fisheries Act, if someone is caught digging in closed clam flats, this person can be fined up to \$5000 and have the clams and equipment seized with possible forfeiture of the equipment. There are other acts and regulations which prohibit the processing and sale of clams containing bacteriological contamination, paralytic shellfish poisoning or other toxins. To ensure the safety and health of consumers, DFO has established an enhanced shellfish monitoring program by increasing the number of sampling sites and instituting a more extensive bioassay analysis (laboratory tests for toxins) of clams and other bivalve molluscs. When bacteria and toxins are present, clam flats are closed to harvesting. Clam diggers must always be aware of closures due to bacterial contamination and the presence of toxins.

At the Saint John workshop the clam diggers also discussed the extent to which coastal pollution, especially from sewage, has damaged productive clam flats. They expressed frustration with the dumping of raw or inadequately treated sewage into the ocean and stated that unless matters improve, the development of management plans would be a futile effort. To address these and other conservation problems confronting the industry, DFO has formed the new Scotia-Fundy Soft-Shell Clam Advisory Committee to tackle the issue of managing this growing fishery.

Departmental Contact:

David Jennings
Communications Branch
Fisheries and Oceans
P.O. Box 550
Halifax, N.S. B3J 2S7



BACKGROUNDER

FICHE D'INFORMATION

FOR IMMEDIATE RELEASE
JANUARY 30, 1989

NEW COMMITTEE TO ADVISE ON SOFT SHELL CLAM MANAGEMENT

The first meeting of the Scotia-Fundy Soft Shell Clam Advisory Committee (SFSSCAC) was held on January 18 in Truro. This industry-government committee was established to improve soft shell clam management in the Region. This would be achieved through enhanced conservation efforts and better communication between representatives of the clam industry and the Department of Fisheries and Oceans (DFO).

The SFSSCAC has been set up to deal with serious issues which confront the soft shell clam industry. Historically there has not been a management plan for the conservation of soft shell clams or limitations on the number of fishermen. Committee member James Webb, a commercial clam digger from Upper Economy on Nova Scotia's Minas Basin, feels the main problem for the soft shell clam industry in Nova Scotia has been overfishing. "There are more commercial fisherman than the flats can handle", he said. Another committee member, Roland Power from Lower Five Islands, added that he would like to see clam size limits and a closed season during the winter months to allow rebuilding of soft shell clam populations.

Along the Bay of Fundy in New Brunswick commercial clam fishermen are facing ever increasing losses of clam flats due to closures brought on by bacterial contamination. Environment Canada and DFO are involved in sampling and analyzing water quality and clams in clam flat areas to ensure that public health is protected. Closures are of vital concern to clam diggers and committee member Larry Foster, of Charlotte County New Brunswick, would like to see substantially increased monitoring of water quality conditions to ensure that clam flat closures are based upon current information. Mr. Bellefontaine told the committee these concerns were the reason DFO's Habitat Management Branch was represented on the

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committee, for the first time as an integral part of the fisheries advisory process.

Also discussed were proposed changes to the Fisheries Regulations to include minimum soft shell clam size limits and the licensing of commercial diggers.

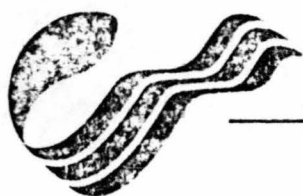
Mr. Bellefontaine emphasized that the establishment of the regional soft shell clam committee is an indication of the importance DFO is placing on the soft shell clam industry in the Scotia-Fundy Region. "The cooperative efforts of the fishing industry and all levels of government is required to implement an effective management plan to benefit clam diggers, buyers and processors. Such a plan would seek to conserve and restore clam populations, rationalize fishing effort and improve habitat quality", he said.

Through this committee, clam fishermen, processors and buyers will recommend measures for the management and conservation of soft shell clams to the Minister of DFO. Input for these recommendations comes from Soft Shell Clam Advisory Committees in each of the three Scotia-Fundy Areas which are: Eastern Nova Scotia, Southwestern Nova Scotia and Southwestern New Brunswick. The committee also includes representatives of Municipal Associations and representatives from the provincial governments of both New Brunswick and Nova Scotia. The Federal government is represented by the Department of the Environment and DFO. This committee is chaired by Mr. Neil Bellefontaine, DFO's Regional Director of Fisheries and Habitat Management in the Scotia-Fundy Region.

The landed value of soft shell clams in the Scotia-Fundy Region in 1987 was over five million dollars.

DEPARTMENTAL CONTACT:

CARL MYERS
COMMUNICATIONS BRANCH
FISHERIES AND OCEANS
P.O. BOX 550
HALIFAX, NOVA SCOTIA
B3J 2S7



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FOR IMMEDIATE RELEASE
December 2, 1988

Clam Fishermen Elect Representatives to Regional Committee

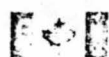
The November 24 meeting in Digby of the Southwest Nova Scotia Clam Advisory Committee (SNSCAC) was highlighted by the election of four of its clam industry members to the newly formed Scotia-Fundy Clam Advisory Committee. This region wide committee will be made up of fishermen's representatives from the Bay of Fundy and the Atlantic coast of Nova Scotia.

Carey Edwards, Roland Power and James Webb, fishermen from Digby and Colchester Counties, will represent the SNSCAC, and Terry Wilkins, from the Annapolis Basin Clam Diggers Association, will represent fishermen from Southwest Nova Scotia at the Regional committee, scheduled to meet for the first time in mid December.

The SNSCAC is made up of representatives of clam fishermen, buyers, the Nova Scotia Department of Fisheries, the Municipality of Annapolis County, and Department of Fisheries and Oceans (DFO) fishery managers and scientists. This committee provides clam fishermen with the opportunity to become involved in making decisions that affect the clam industry and in recommending research needs to DFO clam biologists.

The wider Scotia-Fundy Clam Advisory Committee will provide advice to the Minister of DFO on such matters as clam management, habitat, licensing and conservation related regulations.

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The clam fishery in the Scotia-Fundy Region is currently unregulated. Because of the concerns raised by commercial clam fishermen that clam populations are being jeopardized by overharvesting, a number of resource management measures are now being considered by DFO to conserve and restore the Region's valuable clam resource. During the meeting, fishermen emphasized the need to have regulations enacted as soon as possible.

The new committee chairman, Mr. Freeman Libby, DFO's Southwest Nova Scotia Area Inspection Chief, stressed the importance of past efforts of the SNSCAC. He pointed to the contribution of clam fishermen in recommending workable strategies to conserve clam populations and the input they provided for a comprehensive clam enhancement project. This study is now being carried out by DFO scientists and is aimed at providing information to improve stock management and restore the productivity of clam flats. Mr. Libby told the committee that DFO places a high priority on the clam industry and depends on the advice and assistance of clam fishermen to improve existing conditions.

The Scotia-Fundy clam fishery in 1987 was worth conservatively five million dollars; 49% of that came from the Southwest Nova Scotia area.

DEPARTMENTAL CONTACT:

CARL MYERS
COMMUNICATIONS BRANCH
FISHERIES AND OCEANS
P.O. BOX 550
HALIFAX, NOVA SCOTIA
B3J 2S7
(902) 426-9318



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FOR IMMEDIATE RELEASE

May 26, 1988

NEW MANAGEMENT PLAN TO BENEFIT CLAM INDUSTRY

YARMOUTH - A new soft-shell clam management plan and a five-year enhancement program worked out with the industry will create a healthier resource and higher incomes for Scotia-Fundy fishermen, the Honourable Tom Siddon, Minister of Fisheries and Oceans, said today.

The new plan is largely the result of a government-industry workshop held last September in Truro, N.S., and further consultations between government and industry over the past seven months.

"In this new plan, I have put the fishermen's suggestions to work," Mr. Siddon said. "I am also sponsoring a second Soft-Shell Clam Workshop for the near future, where my officials and industry representatives can develop more detailed plans for managing and developing this fishery."

A five-year enhancement program includes projects to protect and restore clam habitat, re-seed clam beds, and improve harvesting techniques. Mr. Siddon said "This year, \$150,000 will be devoted to clam enhancement projects in the Bay of Fundy. Clam harvesters themselves will help plan and carry out these local enhancement projects through the direct input of clam advisory committees."

The soft-shell clam management plan will include commercial licensing for clam diggers for the first time. This measure follows strong representations from fishermen. The licences will identify commercial clam fishermen, and make possible further measures to benefit them in future.

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A new minimum size limit of 1-3/4 inches will help rebuild the heavily exploited clam beds.

Scientific research on clams will also increase, especially on stock assessment, habitat, and development.

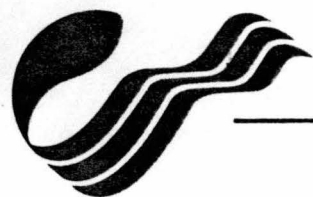
The Department of Fisheries and Oceans (DFO) has also made a commitment to increase its enforcement and inspection work, further ensuring a well-managed fishery and thereby providing safer products to consumers. This will involve enhanced enforcement of shellfish areas closed for bacteria, P.S.P. or other toxins.

The clam industry in the Scotia-Fundy Region (which takes in the coast from the northeast tip of Cape Breton to the New Brunswick-Maine border) has a landed value of about \$6.5 million and provides work for about 1,200 commercial diggers.

In recent years, commercial clam diggers have expressed concerns that increasing numbers of fishermen were reducing the average income per fisherman and depleting the stocks. Until now, no management plan applied for this fishery.

FOR MORE INFORMATION:

Communications Branch
Fisheries and Oceans
P.O. Box 550
Halifax, N.S. B3J 2S7
(902) 426-3550



BACKGROUND

FICHE D'INFORMATION

THE CLAM FISHERY OF SOUTHWESTERN NEW BRUNSWICK

Pollution and overexploitation are threatening an important clam industry in southwestern New Brunswick. Most of the pollution results from the general growth in human habitation along the coast and has led to major beach closures, such as the shutdown of much of Passamaquoddy Bay last fall, and has stunted the growth of this promising harvest. As a result the Department and Fisheries and Oceans (DFO) and the clam diggers themselves have taken urgent measures to turn the tide on coastal pollution. They are creating a management and development plan to protect the remaining clam beds, to reclaim lost areas and even to create new clam habitat.

Some people may be surprised to hear that a clam industry even exists, since clamming has traditionally been seen by the public as a recreational activity. Yet it was worth \$3 million in southwestern New Brunswick in 1986, its peak year, and \$5.6 million in the wider Scotia-Fundy Region (from the tip of Cape Breton to the New Brunswick-Maine border). That's a doubling of value over five years, driven by high prices and high demand. Most of the production is in the Bay of Fundy, and most of that on the New Brunswick side--especially in six very productive

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areas: Lepreau, Pocologan, Passamaquoddy Bay, Deer Island, Campobello Island and Grand Manan Island. Clamming employs some 200 full time diggers and another 200-300 part time ones in these and other areas of New Brunswick's Fundy shore. In addition there are some 20 plants that hold, shuck and ship the clams. A few even import clams from the U.S.

The problem is that no sooner has the industry blossomed than it's being threatened, largely by bacterial contamination. As areas are closed diggers move to other areas, overtaxing them. Last year's closure of most of that part of Passamaquoddy Bay known as Area 16 (St. Andrews-St. George area) where 125 diggers harvested some \$1.5 million worth of clams a couple of years ago, plus closures of parts of Lepreau, Grand Manan and elsewhere brought a sharp halt to rising clam production. The figures are eloquent. From its 1986 peak of \$3 million the value of the clam harvest in southwestern New Brunswick dropped to \$2.4 million in 1987 and to less than a million last year. For Scotia-Fundy the drop was from \$5.6 million in 1986 to \$5 million in 1987 and just above \$2 million last year. With Area 16 closed both those figures will likely drop again this year.

The effort to save the industry has involved the creation of a Scotia-Fundy Soft Shell Clam Advisory Committee (SFSSCAC) and a five-year clam enhancement program beginning with a variety of very practical studies that, when results are obtained, will as quickly as possible be transformed into working techniques. These include experiments with such things as seeding beaches, with

different harvesting techniques such as rotational digging and selective openings of parts of closed areas based on more fine-tuned monitoring. Initiatives are also being taken to identify and deal with the sources of the pollution.

The first move of the new committee has been to bring clams under a fishery management regime. Fisheries in Atlantic Canada are managed through advisory committees in which fishermen, processors and DFO representatives collectively decide most of the rules and regulations that will prevail in the fishery in question. The SFSSCAC (which is supported by Clam Advisory Committees in each of DFO's three management Areas in Scotia-Fundy) is such a management mechanism for the clam sector. It is looking at such things as licencing clam diggers in order to control their numbers, imposing minimum clam size limits, and instituting closed seasons during winter months.

Until now anybody could dig clams pretty well any time and in any place that was not closed by DFO. This in itself has led to overexploitation by both professional and recreational diggers as the price of clams soared in the 1980's, driven by a new appreciation, especially by American consumers, of what Maritimers have known for centuries--that clams are delicious.

In tandem with this management process DFO has initiated a five-year plan (1988-1992) to preserve and increase the clam harvest. The first phase involves mostly biological studies and data collection to establish the impact of harvesting practices, pollution and other forms of habitat degradation. In phase two

enhancement techniques such as seeding barren flats, brushing and harrowing the flats to improve the survival rate of seed, spat collection, hatchery development and other measures will be tried and evaluated on the small scale. In phase three the results of these studies and demonstrations will be applied to large scale enhancement projects in appropriate areas.

As part of phases one and two, \$180,000 was spent in 1988 and another \$150,000 is earmarked for 1989. Projects involve contracting diggers to seed small plots in different areas for study purposes, hiring students to gather catch and effort data to identify rates of harvesting, sizes of clams, etc., and scientific studies on clam growth and mortality (being carried out in labs at Dalhousie University in Halifax).

Closer monitoring so that closed areas, or sub-beaches in closed areas, can be opened intermittently when bacterial levels go down may be tried in pilot-scale experiments in Area 16 this year, depending on available resources. Such 'conditional openings' could help recoup clams that would otherwise be lost. High bacteria in most areas is usually associated with heavy rains. With closer testing it might be found that clams are harvestable in dry periods, for example. Any wider program, however, will require more resources to monitor, test and enforce closures than DFO now possesses.

Closer monitoring could also allow opening of smaller areas now part of large scale closures for Paralytic Shellfish Poisoning (PSP) which occurs along the Bay of Fundy every year

and is another complicating factor for the industry. More depuration facilities is also a possibility to enhance the value of the harvest. These plants hold clams in clean-flowing water to allow for a natural cleansing of bacteria to occur. There's one of these on Campobello Island and another at St. George.

There are also efforts to indentify the source of the bacteria and, if possible, to initiate actions to ``clean up.'' The prototype cleanup initiative is the Chamcook Harbour Working Group consisting of diggers, processors, other local citizens plus federal and provincial officials. The group is seeking a long-term solution to the pollution problem as it affects Chamcook Harbour, which is in Area 16, and to establish a plan or course of action that could be adapted to other areas of the Bay of Fundy. The group's early work involve the development of terms of reference for a comprehensive study and options for cleaning up.

The soft-shell clam has become recognized as an important fishery resource in Scotia-Fundy, especially so in southwestern New Brunswick. DFO considers its protection and enhancement as a major priority. Clams offer one more reason why coastal pollution, which threatens other fish habitat as well, must be checked and reversed at all costs. With the cooperative effort of diggers, communities, provincial governments and DFO plus other federal agencies and departments, this objective can be accomplished.