

INTERNATIONAL COURT OF JUSTICE

PLEADINGS, ORAL ARGUMENTS, DOCUMENTS

**CASE CONCERNING DELIMITATION
OF THE MARITIME BOUNDARY
IN THE GULF OF MAINE AREA**

(CANADA/UNITED STATES OF AMERICA)

VOLUME IV

Counter-Memorial of the United States of America



COUR INTERNATIONALE DE JUSTICE

MÉMOIRES, PLAIDOIRIES ET DOCUMENTS

**AFFAIRE DE LA DÉLIMITATION
DE LA FRONTIÈRE MARITIME
DANS LA RÉGION DU GOLFE DU MAINE**

(CANADA/ÉTATS-UNIS D'AMÉRIQUE)

VOLUME IV

Contre-mémoire des Etats-Unis d'Amérique



The case concerning *Delimitation of the Maritime Boundary in the Gulf of Maine Area*, entered on the Court's General List on 25 November 1981 under number 67, was the subject of a Judgment delivered on 12 October 1984 by the Chamber constituted by the Order made by the Court on 20 January 1982 (*Delimitation of the Maritime Boundary in the Gulf of Maine Area, Judgment, I.C.J. Reports 1984*, p. 246).

The pleadings and oral arguments in the case are being published in the following order:

- Volume I. Special Agreement; Memorial of Canada.
- Volume II. Memorial of the United States of America.
- Volume III. Counter-Memorial of Canada.
- Volume IV. Counter-Memorial of the United States of America.
- Volume V. Replies of Canada and the United States of America.
- Volume VI. Commencement of Oral Arguments.
- Volume VII. Conclusion of Oral Arguments; Documents submitted to the Court after closure of the written proceedings; Correspondence.
- Volume VIII. Maps, charts and illustrations.

Canada filed its pleadings both in English and in French. Although Canada has two official languages, only the English text of those documents is reproduced on the ensuing pages of these volumes, as Canada has informed the Registry that the English text should be seen as authoritative for the purposes of interpretation.

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In addition to the normal continuous pagination, the Volumes feature on the inner margin of pages a bracketed indication of the original pagination of the Memorials, the Counter-Memorials, the Replies and certain Annexes.

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L'affaire de la *Délimitation de la frontière maritime dans la région du golfe du Maine*, inscrite au rôle général de la Cour sous le numéro 67 le 25 novembre 1981, a fait l'objet d'un arrêt rendu le 12 octobre 1984 par la Chambre constituée par ordonnance de la Cour du 20 janvier 1982 (*Délimitation de la frontière maritime dans la région du golfe du Maine, arrêt, C.I.J. Recueil 1984*, p. 246).

Les pièces de procédure écrite et les plaidoiries relatives à cette affaire sont publiées dans l'ordre suivant :

Volume I. Compromis; mémoire du Canada.

Volume II. Mémoire des Etats-Unis d'Amérique.

Volume III. Contre-mémoire du Canada.

Volume IV. Contre-mémoire des Etats-Unis d'Amérique.

Volume V. Répliques du Canada et des Etats-Unis d'Amérique.

Volume VI. Début de la procédure orale.

Volume VII. Suite et fin de la procédure orale; documents présentés à la Cour après la fin de la procédure écrite; correspondance.

Volume VIII. Cartes et illustrations.

Le Canada a déposé ses pièces de procédure écrite en anglais et en français. Bien que le Canada ait deux langues officielles, seul le texte anglais de ses écritures est reproduit dans les volumes ci-dessus, le Canada ayant fait savoir au Greffe que, en cas d'interprétation, c'était le texte anglais qui devait faire foi.

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**COUNTER-MEMORIAL OF THE
UNITED STATES OF AMERICA**

**CONTRE-MÉMOIRE
DES ÉTATS-UNIS D'AMÉRIQUE**

COUNTER-MEMORIAL SUBMITTED BY THE UNITED STATES OF AMERICA

INTRODUCTION

1. This Counter-Memorial is filed in accordance with the 5 November 1982 order issued by the President of the Chamber formed to deal with the Case Concerning Delimitation of the Maritime Boundary in the Gulf of Maine Area fixing 28 June 1983 as the time-limit for the filing of Counter-Memorials by the United States of America and by Canada (the "Parties").

2. In accordance with Article 49 of the Rules of Court, the purpose of this Counter-Memorial is to reply to the Canadian Memorial filed on 27 September 1982 in the present proceedings (the "Canadian Memorial"), and, as may be necessary, to supplement the considerations of fact and law set forth in the Memorial filed by the United States in these same proceedings on the same date (the "United States Memorial").

3. This Counter-Memorial of the United States is divided into the following parts:

Part I contains admissions or denials of facts stated in the Canadian Memorial, and, as necessary, additional facts relating to: geography, geomorphology and geology, marine environment, fishing activities of the Parties and their nationals, continental shelf activities of the Parties and their nationals, other relevant activities, and the history of the dispute.

Part II contains observations on the statements of law in the Canadian Memorial and statements of law in answer thereto.

Part III contains the application of the law to the facts in this case, with reference to the specific misapplications of the law to the facts contained in the Canadian Memorial.

The final part of the Counter-Memorial sets forth the United States Submissions to the Chamber.

4. Included in this submission is a Summary of Argument at the beginning of the Counter-Memorial, and a five-volume Annex: Volume I contains "The Marine Environment of the Gulf of Maine Area" (Volume IA) and "Environmental Risks of Hydrocarbon Development on the North-eastern Portion of Georges Bank" (Volume IB); Volume II contains "Activities of the United States and Canada Under the International Convention for the Northwest Atlantic Fisheries"; Volume III contains "A Factual Analysis of the Socio-Economic Arguments in the Canadian Memorial"; Volume IV contains additional analytical annexes relating to geomorphology and geology, hydrocarbon resources, fishing activities of the Parties in the Gulf of Maine area, as well as State practice relating to maritime boundaries; and Volume V contains miscellaneous documentary annexes.

SUMMARY OF ARGUMENT

5. On 27 September 1982, the United States and Canada submitted Memorials to this Court that set forth their respective views on the law and facts applicable to the delimitation of the single maritime boundary in the Gulf of Maine area. The United States, in its submission, proposed that the single maritime boundary be a line perpendicular to the general direction of the coast, but adjusted during its course to avoid dividing two fishing banks on the Scotian Shelf, Browns Bank and German Bank, both of which would be left in their entirety to Canada. In its submission, Canada proposed that the single maritime boundary split Georges Bank, based upon an application of the equidistance method. Figure 1.

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6. This United States Counter-Memorial demonstrates that the Canadian line is not the result of the application of equitable principles, does not take account of the relevant circumstances in the area, and does not produce an equitable solution. The United States shows that: (1) Canada has misconstrued the Court's function in delimitation cases by seeking an equitable apportionment, or sharing out, of the area and its resources; (2) Canada has failed to identify and to apply equitable principles, notwithstanding Canada's agreement in principle that the fundamental rule in delimiting this single maritime boundary requires that the delimitation be in accordance with such principles; (3) the Canadian line rests chiefly upon arguments, previously rejected by this Court, that the economic factors of dependence and relative wealth and the geometrical factor of proximity are relevant to delimitation; (4) Canada has ignored the coastline of the United States facing the Atlantic Ocean, as well as other essential facts constituting relevant circumstances; and, (5) Canada has misconstrued other facts, all resulting in manifest misapplications of the law to the facts in this case.

7. Canada has misapplied the law to the facts, with particular regard to the following matters:

Canada, in its Memorial, ignores the location of the land boundary in the far northern corner of the Gulf of Maine. Canada also ignores the United States coast in the vicinity of Maine and New Hampshire. The primary coastal front of the United States at Maine and New Hampshire, a coast that faces the area being delimited, cannot be disregarded if the equitable principle that the land dominates the sea is to be applied and respected in this case. The Canadian line impermissibly "cuts off" the United States coast of Maine and New Hampshire from

its natural extension. The Canadian line also gives exaggerated effect to a short section of Canadian coastline that (a) is aberrant to the general geographical relationship between the Parties, because it lies perpendicular to the general direction of the coast; and (b) is south of the international boundary terminus.

Canada incorrectly applies the proportionality test. Canada includes in its calculations coastlines within the Bay of Fundy that do not front on the area being delimited. Canada also asserts that the area to be delimited seaward of the Gulf of Maine is so indeterminate that the proportionality test cannot be applied. These contentions have no basis in law or fact. The maritime area that would appertain to the respective Parties pursuant to the Canadian line is not proportional to the lengths of their relevant coastlines.

The Canadian line ignores the dominant physical feature of the marine environment of the Gulf of Maine area—the Northeast Channel. Contrary to Canada's assertions, the Northeast Channel is a significant geomorphological feature, constituting the only major break in the surface of the continental shelf in the Gulf of Maine area. It substantially shapes the marine environment. It constitutes the only natural boundary in the area, dividing the separate and identifiable ecological regimes of Georges Bank and of the Scotian Shelf, as well as the valuable stocks of fish and shellfish associated with those respective regimes.

Canada ignores the predominant interest of the United States on Georges Bank and in the Gulf of Maine Basin, as evidenced by the activities of the United States and its nationals since the founding of the Republic. Canada seeks to create in its Memorial a Canadian historical interest in Georges Bank when in fact there is none. Canada's recent and limited fishing activities on Georges Bank should not outweigh the predominant historical and present fishing interests of the United States.

In this regard, the fisheries of Georges Bank were first developed by the United States and, until recently, were exploited almost exclusively by United States fishermen. Furthermore, Georges Bank is the final stronghold of the New England fishing industry. Over the past 100 years, United States fishermen gradually have been expelled from all of their traditional fishing grounds off Canada. In June of 1978, Canada unilaterally terminated reciprocal fishing arrangements between the Parties, barring United States fishermen from areas in Canada's 200-nautical-mile fishing zone where United States fishermen had fished for more than two centuries.

Canada is mistaken in its arguments that (a) United States fishermen do not fish significantly on the northeastern portion of Georges Bank, and that (b) fishermen from Maine do not fish at all on the Bank. Canada is further mistaken in its argument that the activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries (ICNAF) amounted to a United States and Canadian "partnership" with respect to Georges Bank. Finally, Canada is mistaken when it ignores the predominant interest of the United States, as a relevant circumstance in this case, in regard to such matters as charting and surveying, scientific research, search and rescue, and defense. The Canadian line, therefore, is inconsistent with the longstanding pattern of conduct of the Parties, as well as with geography.

8. Canada seeks to argue that the rejected and unratified 1979 east coast fisheries agreement is a relevant circumstance. That failed agreement is legally irrelevant. Moreover, that rejected and unratified agreement did not deal exclusively with the relations of the Parties in regard to the fisheries of Georges Bank, but with the fisheries in the waters of the Atlantic Ocean extending from North Carolina to Newfoundland. The failed agreement in no way addressed the location of the single maritime boundary in this case. The United States did not ratify the proposed agreement because it was fundamentally unfair to the United States.

9. In its Memorial, Canada seeks to place "special weight" on the economic factors of dependence and relative wealth. As a matter of law, these considerations are not to be taken into account in the delimitation of a single maritime boundary. As a matter of fact, Canada's contentions in this regard, even if they were relevant, are incomplete and misleading.

10. The Canadian line also ignores the principles that the single maritime boundary should facilitate resource conservation and should minimize the potential for international disputes between the Parties. The Canadian line splits Georges Bank, dividing the resident stocks of commercially important fish and shellfish resources. Such a division would undermine the conservation of those stocks and create an irritant in the relations between the Parties. The line proposed by Canada would allow Canada to make decisions on oil and gas development on the northeastern portion of Georges Bank. Any marine pollution resulting from such development could affect fisheries remaining under United States jurisdiction. At the same time, Canada would bear no significant risk that such decisions would affect Canadian fisheries interests on the Scotian Shelf. Any such result has the potential for causing serious political disputes between Canada and the United States.

11. Finally, in its Memorial Canada has distorted State practice generally and, in particular, has ignored State practice in geographically similar situations, i.e., where the location of the land boundary, in relation

to a large coastal concavity, would cause an equidistant line to encroach upon the extension of the coastal front of one of the States concerned. An analysis of such situations, as in the North Sea between the Federal Republic of Germany and Denmark and between the Federal Republic of Germany and the Netherlands, and in the Bay of Biscay between France and Spain, shows that, in such cases, the equidistance method was not applied for the greater part of the boundary; rather, other methods were used that were better able to provide for the seaward extension of the respective coastal fronts.

12. The United States reaffirms that the adjusted perpendicular line that it proposes does not encroach upon Canada's primary coastal front facing the Atlantic Ocean; that the adjusted perpendicular line respects the natural boundary at the Northeast Channel, thereby facilitating the conservation and management of the resources of the area and minimizing the potential for disputes between the Parties; and, that the adjusted perpendicular line takes account of the relevant circumstances in the area—particularly the separate and identifiable ecological regimes of Georges Bank and of the Scotian Shelf and the longstanding use of Georges Bank by United States fishermen.

13. Contrary to the argument made by Canada, the United States has not consented, by its conduct, either expressly or tacitly, to an equidistance boundary in the Gulf of Maine area. Canada seeks to establish such consent on the basis of an exchange of correspondence, concerning Canadian oil and gas permits on Georges Bank, initiated by a mid-level government employee from an agency of the United States Government that does not have the responsibility for foreign relations. Contrary to the requirements of the law, the conduct at issue does not establish either a clear and unambiguous claim by Canada or the unequivocal consent of the United States to such a claim. The United States government employee expressly stated that there was no agreed boundary, and that he had no authority to discuss boundary matters. During this period, the United States was engaged in continental shelf activities on Georges Bank that were inconsistent with any claim by Canada to a boundary line splitting Georges Bank. Furthermore, the events at issue occurred over a brief period that is insufficient as a matter of law. Finally, the Canadian claim of acquiescence is based upon activity relating solely to the continental shelf, thereby ignoring the fisheries dimension of the case. The United States, for all these reasons, is in no wise precluded by the doctrines of acquiescence and estoppel from advancing its boundary claim.

14. In summary, the adjusted perpendicular line proposed by the United States is a boundary that is derived from the application of equitable principles, and that takes account of the relevant circumstances in the area, to produce an equitable solution. The Canadian line, on the contrary, is not based on such principles, does not take account of such circumstances, and would not produce an equitable solution.

PART I. THE FACTS

INTRODUCTION

15. This Part will discuss the factual context of the maritime boundary dispute submitted to this Court by the Parties, having regard to the statement of the facts set forth in the United States Memorial at paragraphs 19 through 163 and the contentions of fact made in the Canadian Memorial at paragraphs 17 through 276. This Part is divided into seven chapters: (1) geography; (2) geomorphology and geology; (3) marine environment; (4) fishing activities of the Parties and their nationals; (5) continental shelf activities of the Parties and their nationals; (6) other relevant activities; and (7) history of the dispute. Each chapter identifies areas of agreement and disagreement between the Parties, as appropriate, and discusses areas of significant difference between them.*

*The United States reserves the right to identify in later stages of these proceedings additional areas of agreement, disagreement, or significant difference between the Parties.

CHAPTER I

GEOGRAPHY

SECTION 1. Points of Agreement and Disagreement Between the United States and Canadian Memorials

16. The United States and Canada are in agreement concerning many geographical factors relevant to this case¹. The United States Memorial defines the Gulf of Maine area—the geographical area relevant to this case—to include the coasts and geographical features from Nantucket Island, Massachusetts, to Cape Canso, Nova Scotia, and the marine areas seaward from these coasts to the limit of coastal-State jurisdiction². Canada describes the Gulf of Maine area in comparable terms:

“The ‘Gulf of Maine area’ encompasses the Gulf of Maine itself, as well as Georges Bank and the nearby coasts of the Parties facing the Atlantic³.”

- ⑧ Figure 8 of the Canadian Memorial, listed as depicting the “coasts and major geographic features of the Gulf of Maine area”, and reproduced
- ⑧ here at Figure 2, illustrates the area relevant to this case⁴.

¹ The geographical setting of this case is described at paras. 20-29 of the United States Memorial.

² United States Memorial, para. 25. In this Counter-Memorial, as in the United States Memorial (see para. 25, n. 2), “Gulf of Maine” refers to the seabed and body of water landward of a hypothetical line between Nantucket Island and Cape Sable. It does not include the Bay of Fundy. “Gulf of Maine Basin” refers to the Gulf of Maine, except for that part of the Scotian Shelf and superjacent waters that are in the Gulf of Maine. “Gulf of Maine area” refers to the broader area described in the text. The Gulf of Maine area is also the “relevant area” for determining the relevant circumstances in this case.

³ Canadian Memorial, para. 35. There are, however, some differences. The Canadian Memorial, at paras. 20 and 35, includes within the Gulf of Maine area the coast of Nova Scotia facing the Atlantic Ocean, but fails to mention many of the major fishing banks located off that coast, including Roseway Bank, La Have Bank, Emerald Bank, Sable Island Bank, Middle Bank, Canso Bank, and Banquereau. Canada also includes the United States coastline as far to the southwest as Rhode Island. Figure 2.

⁴ Canadian Memorial, para. 20. The Gulf of Maine area is defined in comparable terms at para. 25 of the United States Memorial. Both Parties indicate that the boundary area has an inner and outer component. See United States Memorial, paras. 25 and 29; Canadian Memorial, paras. 329 and 342-356.

17. The United States and Canada also agree that the general direction of the coast is northeastward in the Gulf of Maine area¹. In the vicinity of the international boundary terminus, at the far northern corner of the Gulf of Maine, the United States coastline falls away to the southwest in a relatively straight line to Cape Ann, where it begins to curve southward towards Cape Cod. The Canadian coastline extends northeastward from the international boundary terminus, following the general direction of the coast to the Chignecto Isthmus. As Canada states:

“The Canadian coastline within the Gulf of Maine extends in a general northeasterly direction from the Canada-United States boundary in Passamaquoddy Bay, along the southern shore of New Brunswick within the Bay of Fundy, to a point near the New Brunswick-Nova Scotia border at the head of Chignecto Bay, the northeastern extremity of the Gulf of Maine².”

18. The Parties thus agree that the Chignecto Isthmus is the geographic feature that marks the beginning of the change in direction of the Canadian coast. From there, a series of radical changes in the direction of the Canadian coastline occurs, combining to create: (a) a short secondary Canadian coastline at a right angle to the east coast of North America, across from the land boundary terminus, and (b) a protrusion of the Nova Scotia peninsula south of the land boundary.

19. Irrespective of these similarities of view, there are two major areas of disagreement between the Parties with regard to geography. One of these is the geographical relationship of the Parties, including the general direction of the coast in the relevant area, the adjacent or opposite nature of the coasts within that geographical relationship, and the north-south juxtaposition of the broad geographical relationship between the two States. The second major area of disagreement relates to the significance of certain coastal features in the Gulf of Maine area: (1) the coasts of Maine and New Hampshire; (2) the southwestern-facing coast of the Nova Scotia peninsula; (3) the coastlines of the Bay of Fundy; and (4) Cape Cod, Nantucket Island, and Martha's Vineyard.

¹ Canadian Memorial, paras. 19, 21, and 22.

² Canadian Memorial, para. 21. The Bay of Fundy (including Chignecto Bay) is not a part of the Gulf of Maine or the Atlantic Ocean. International Hydrographic Organization (I.H.O.), *Limits of Oceans and Seas*, 3rd ed., Spec. Pub. No. 23, 1953. See Annex 11, Vol. V. The I.H.O. treats the Gulf of Maine as part of the Atlantic Ocean. The I.H.O. draws a distinction between the Gulf of Maine and the Bay of Fundy.

SECTION 2. The Geographical Relationship of the Parties

A. THE GENERAL DIRECTION OF THE COAST IN THE GULF OF MAINE AREA IS NORTHEASTWARD AT 54 DEGREES, NOT 67 DEGREES AS CANADA APPEARS TO ALLEGE

20. The United States has established a constant bearing of 54 degrees as the general direction of the North American east coast in the relevant area ¹. Fifty-four degrees corresponds both to a line in the interior of the Gulf of Maine area connecting Cape Ann to the Chignecto Isthmus and to a line in the exterior connecting Nantucket Island through Seal Island to Halifax. It is also a line that reflects the constant bearing between prominent coastal features along the North Atlantic coast ².

21. Canada, while agreeing that the general direction of the coast is northeastward, suggests that there are two "directional trends" to the North American east coast: one from southern Florida to Long Island, New York, and the other from Long Island to Cape Race, Newfoundland ³. Figure 3 shows the "trends" depicted in Figure 7 of the Canadian Memorial, together with the general direction of the coast, as set forth in the United States Memorial. Canada gives no justification for its use of one "trend" from Florida to Long Island or of another "trend" from Long Island to Cape Race.

22. As indicated in the United States Memorial, there are bearings more advantageous to the United States than that of 54 degrees that may be used in ascertaining the general direction of the coast for the purpose of establishing the perpendicular ⁴. Such bearings, however, are determined by points outside the Gulf of Maine area and, accordingly, have not been used. For the same reason, and because of its substantial deviation from the general direction of the east coast of North America as a whole,

(32) ¹ United States Memorial, para. 283 and Figure 26. As in the United States Memorial, all directions referred to in this Counter-Memorial are determined from true north. United States Memorial, para. 21, n. 2.

North Florida to Cape Pine, Newfoundland (53.6 degrees)

Cape Hatteras, North Carolina to Cape St. Mary's, Newfoundland (54.1 degrees)

Cape Charles, Virginia to Cape Canso, Nova Scotia (53.9 degrees)

(32) ² See United States Memorial, para. 21, n. 2, para. 283, and Figure 26.

³ Canadian Memorial, para. 19.

⁴ United States Memorial, para. 283, n. 7.

Canada's trend line from Long Island to Cape Race, which has an average true bearing of 67 degrees¹, has no basis².

B. THE GEOGRAPHICAL RELATIONSHIP OF THE COASTS OF THE PARTIES IN THE RELEVANT AREA IS GENERALLY ADJACENT, PARTICULARLY IN THE EXTERIOR OF THE GULF OF MAINE AREA

23. In its Memorial, the United States did not dwell upon any distinction between opposite and adjacent coasts. Until the filing of the Canadian Memorial, the Parties had expressed similar views with regard to the geographical relationship in the exterior of the Gulf of Maine area³. In the past, Canada has acknowledged that the United States and Canada were adjacent States. The Canadian Memorial represents a change in Canada's position.

24. As one reflection of Canada's previous position, Canada in the past made reference in diplomatic correspondence to Article 6(2) of the 1958 Geneva Convention on the Continental Shelf, the provision relating to adjacent States, and not to Article 6(1), the provision relating to opposite

¹ The United States determined that the Canadian "trend" line from Long Island, New York, to Cape Race, Newfoundland, has a bearing of 67 degrees in the following manner. The directional trends shown in Figure 7 of the Canadian Memorial are straight lines on a Lambert Conformal Projection. Such straight lines approximate arcs of great circles. By definition, the direction along an arc of a great circle constantly changes; however, an initial azimuth can be determined between two points along an arc of a great circle. To determine the general direction shown by Canada, intervals of one degree of longitude were selected along the Long Island-to-Cape Race line. Initial azimuths calculated between the great-circle segments ranged from about 61 degrees to 74 degrees, with an average of approximately 67 degrees. In the area between Cape Cod and Cape Sable, the initial azimuths ranged between 63 degrees and 65 degrees, with an average of about 64 degrees.

² Although the general direction of the coast in the Gulf of Maine area may vary a degree or two depending upon what points are picked, a purported direction of 67 degrees is outside any reasonable range. See Annex 12, Vol. V. It should be added that 54 degrees is the average of (a) the bearing between the southernmost point on the coast in the Gulf of Maine and the northernmost point of the Bay of Fundy, and (b) the bearing between the westernmost point in the Gulf of Maine and the easternmost point in the Bay of Fundy. The northernmost point in the Bay of Fundy is the Chignecto Isthmus. The southernmost point on the Gulf of Maine coast is Barnstable Harbor on Cape Cod Bay. The bearing between these points is 46.7 degrees. The westernmost point in the Gulf of Maine is at Boston. The easternmost point in the Bay of Fundy is Minas Basin. The direction between these points is 61.6 degrees. The average between these two directions is 54.1 degrees. For a chart depicting these directions and the general direction of the coast, see Annex 13, Vol. V.

³ See United States Memorial, paras. 281 and 326.

States¹. Furthermore, when Canada first informed the United States on 14 October 1977 of its legal rationale for its present line, that rationale included a clear statement by Canada's representatives that the coastal relationship in the vicinity of Georges Bank is one of adjacency².

25. Canada asserts in its Memorial, however, that, in the interior of the Gulf of Maine, the "prevailing geographical relationship . . . is largely one of opposite coasts"³; that the "opposite relationship is most pronounced . . . between Cape Sable and Cape Cod"⁴; and, in a change from its prior position, that, in the exterior area, including Georges Bank, "the geographical situation in the more seaward portions of the outer area is a complex one that combines elements of both oppositeness and adjacency, in varying degree"⁵.

26. Within the Gulf of Maine area, the United States and Canadian coasts are adjacent, not opposite. Although such determinations often are a matter of perspective, States that share a common land boundary along a relatively straight coastline, such as that extending in the interior area from Cape Ann to the Chignecto Isthmus, are adjacent States. Moreover, even though the southwestern-facing coast of the Nova Scotia peninsula is aligned at virtually a right angle to the coast of the state of Maine, the situation in the interior area is still adjacent, since those coasts are not opposite each other⁶.

27. The relationship remains adjacent within the area where Canada says the element of oppositeness is most pronounced. Between Cape Cod and Cape Sable, the location of the Canadian line is controlled by rocks off the southwestern-facing coast of Nova Scotia, and by points on the United States coast on Mount Desert Rock and Matinicus Rock off the

¹ See Note No. 1126 from the Dept. of External Affairs to the Embassy of the United States, dated 19 Sept. 1974, United States Memorial, Annex 60, Vol. IV, and Note No. 626, from the Embassy of Canada to the Dept. of State, dated 22 Dec. 1976, United States Memorial, Annex 66, Vol. IV.

² At paras. 155 and 156, the United States Memorial explains the context in which United States officials were first made aware, on 14 October 1977, of Canada's intention to expand its boundary claim. At that meeting, Canadian officials spoke from prepared texts that clearly enunciated the view that, in the region beyond a hypothetical Cape Cod-Cape Sable line, the coasts of the Parties are geographically adjacent and comparable to the Atlantic region seaward of the coasts of the United Kingdom and France.

³ Canadian Memorial, para. 331.

⁴ Canadian Memorial, para. 345.

⁵ Canada appears to accept that the coasts of the Parties are adjacent in the vicinity of the starting point established by Article II of the Special Agreement. Canadian Memorial, para. 336.

coast of Maine, *not* from points in or around Cape Cod¹. These parts of the Maine and Nova Scotia coasts, which control the Canadian line, are not opposite each other. Thus, in arguing that the Canadian and United States coasts are opposite between Cape Cod and Cape Sable, Canada ignores the coastline of the United States within the Gulf of Maine.

28. In the exterior of the Gulf of Maine area, which includes Georges Bank, the relationship between the United States and Canadian coasts is a classic example of adjacency. This was the view postulated by Canada on 14 October 1977, when United States officials were first informed of the new Canadian line. Indeed, Canada draws an analogy between this "outer area" and the geography of the Atlantic region considered by the Court of Arbitration in the *Anglo-French Arbitration*². Yet Canada now fails to come to the same conclusion with regard to the outer area as did the Court of Arbitration with regard to the Atlantic region: "... that in the Atlantic region the situation *geographically* is one of two laterally related coasts, abutting on the same continental shelf which extends from them a great distance seawards into the Atlantic Ocean³."

C. THE GEOGRAPHICAL RELATIONSHIP OF THE PARTIES IS NORTH-SOUTH, NOT EAST-WEST AS SUGGESTED BY CANADA

29. Canada lies generally north of the United States. The land boundary crosses the continent from west to east⁴. Parts of the Maritime

③ ⑮¹ Figures 3 and 32 of the Canadian Memorial show the construction of the Canadian line. Point 49, shown at Figure 32 of the Canadian Memorial, which is equidistant from Matinicus Rock, Maine, and Seal Island, Nova Scotia, is seaward of a hypothetical Cape Cod-Cape Sable line. Matinicus Rock, Maine, continues to be the controlling point on the United States coast for the Canadian line even after that line begins to cross Georges Bank. Canadian Memorial, para. 338.

² Canadian Memorial, paras. 343-344.

³ *Decisions of the Court of Arbitration*, 30 June 1977 and 14 March 1978 [hereinafter *Decisions*], para. 241. [Emphasis added.] The Court of Arbitration noted that, despite the presence of the English Channel, the legal situation of the laterally related British and French coasts might be considered analogous to that of adjacent States. *Ibid.*, at para. 241. In the Gulf of Maine area, the adjacency of the coasts is even more evident. Not only are the coasts "laterally related", but the Parties share a common land boundary.

⁴ The transcontinental boundary is 3,987 statute miles long. The United States Memorial, at para. 20, describes the course of the land boundary across the North American continent from the Strait of Juan de Fuca to Passamaquoddy Bay. For more than one-half of the width of the continent, parallels of latitude are used to define the boundary, comprising 39 per cent of its total length. The parallel of latitude defining the boundary from the Lake of the Woods westward is the longest single straight-line segment of any boundary in the world—1,270.2 statute miles (2,043.8 kilometers). Natural features define 58.7 per cent of the boundary (2,338.7 miles or 3,763.0 kilometers), including the final 129.4 miles (208.2 kilometers) along the St. Croix River until it empties into Passamaquoddy Bay.

Provinces are located to the northeast of the New England states, but this is not surprising, since the general direction of the eastern seaboard of North America, as recognized by both Parties, is oriented on a southwest-to-northeast axis. Nevertheless, the broad geographical relationship between the United States and Canada remains north-south. Because of the concavity that is the Gulf of Maine, the southwestern-facing coast of the Nova Scotia peninsula departs from the general north-south geographical relationship of the Parties ¹.

SECTION 3. Coastal Features of the Gulf of Maine Area

A. THE COASTS OF MAINE AND NEW HAMPSHIRE ARE PART OF THE PRIMARY COASTAL FRONT OF THE UNITED STATES

30. The Canadian line disregards the location of the land boundary terminus in the far northern corner of the Gulf of Maine. The Canadian line thereby also disregards the United States coasts of Maine and New Hampshire for that segment of Canada's line extending beyond the Gulf, amounting to over one-half its length. Canada justifies its disregard in the exterior of the Gulf of Maine area of the primary coastal front of the United States—a coastal front several hundred miles in length and one that faces Georges Bank—on the grounds that fishermen from Maine and New Hampshire have not in the past and do not now fish on Georges Bank. This consideration not only is irrelevant and thus without merit as a matter of law ², it is also factually incorrect ³.

¹ Canada attempts to develop the thesis that the geographical relationship between the Parties is east-west, apparently in an effort to rationalize a maritime boundary that extends southward across the coastal front of the United States. Canadian Memorial, paras. 18 and 35. The support cited for Canada's proposition is that one part of the land boundary "in this sector" is 152 kilometers long (94.5 statute miles or 82.1 nautical miles). This "sector" (*ibid.*, para. 18) makes up less than 1.9 per cent of the overall length of the transcontinental boundary, and is removed from the coastline by a boundary segment that is of greater length. The United States has been unable to verify the 152-kilometer figure cited in the Canadian Memorial. According to the United States-Canada Boundary Commission, Special Report No. 1, 1956, p. 12, the north-south segment that connects the source of the St. Croix River with the St. John River is 77.6 statute miles (124.8 kilometers) in length. See Annex 14, Vol. V.

² Canada's contentions that the coastlines relevant to delimitation are to be determined on the basis of the economic use of an area are novel and without basis in law. Purported economic dependence cannot negate the fundamental principle that the land dominates the sea. See Part II, Chapter II.

³ See Chapter IV, Section 4, of this Part. The implications of Canada's disregard of the coasts of Maine and New Hampshire are addressed in Part III, Chapter III, Section 2, which deals with Canada's misapplications of the law to the facts.

B. THE NOVA SCOTIA PENINSULA PROTRUDES SOUTH OF THE LAND BOUNDARY

31. The Canadian Memorial disregards the fact that the Nova Scotia peninsula protrudes south of the international boundary terminus, combining with the curvature of the New England coast to create the coastal concavity that is the Gulf of Maine ¹.

32. The Canadian Memorial thus ignores geography, and seeks instead to create the impression that the controlling consideration should be the economy of southwestern Nova Scotia peninsula. The Canadian socio-economic contentions are legally irrelevant to the delimitation of the single maritime boundary ² and, moreover, are incomplete and misleading ³.

C. THE COASTLINES OF THE BAY OF FUNDY DO NOT FACE THE AREA BEING DELIMITED AND ARE IRRELEVANT FOR PURPOSES OF THE PROPORTIONALITY TEST

33. Both the United States and Canada use the interior coasts of the Bay of Fundy for purposes of determining coastal direction ⁴. The Parties agree that the coast in the vicinity of the land boundary in the interior of the Gulf of Maine area extends in a relatively straight line to the Chignecto Isthmus, which marks the first major change in the direction of the Canadian coast ⁵. The Parties differ in whether the coasts of the Bay

¹ See United States Memorial, para. 290. The United States coastline defines most of the concavity, because the international boundary terminates in the far northern corner of the concavity. As recognized in other cases, this is a geographical circumstance that may lead to an inequitable delimitation if the equidistance method is used. The Canadian Memorial seeks to describe the coastal concavity as if it were formed only by the curvature of the New England coastline. [para. 340.] Such a description ignores the fact that the deep coastal concavity—the Gulf of Maine—is formed by the coastlines of both the United States and of Canada.

² See Part II, Chapter II, and Part III, Chapter III, Section 6.

³ See Annex 4, Vol. III, A Factual Analysis of the Socio-Economic Arguments in the Canadian Memorial.

⁴ The Canadian Memorial states:

“The Canadian coastline within the Gulf of Maine extends in a general northeasterly direction from the Canada-United States boundary in Passamaquoddy Bay ... to ... Chignecto Bay ...” [para. 21]; and, “[t]he United States coastline ... extends southwestward ... its general configuration follows a straight line” [para. 22].

⁵ Canadian Memorial, paras. 21 and 22; United States Memorial, para. 26.

of Fundy should be included in any proportionality test. In the view of the United States, these coasts must be disregarded for purposes of applying the test of proportionality, since they face only each other, and do not face either the Gulf of Maine or the area seaward of the Gulf¹.

D. CAPE COD, NANTUCKET ISLAND, AND MARTHA'S VINEYARD ARE CLOSELY ASSOCIATED WITH THE GULF OF MAINE AND GEORGES BANK

34. Canada's line pretends that Cape Cod, Nantucket Island, and Martha's Vineyard do not exist². This issue has significance only if the boundary were to be established by the equidistance method, which the United States has shown in its Memorial, and will show further here, is inapplicable in this case. Cape Cod, Nantucket Island, and Martha's Vineyard have played important roles in the history of the United States. They have a long and historic association with Georges Bank, while the Nova Scotia peninsula does not³.

¹ This point is discussed further in Part III, Chapter III, Section 3, which deals with Canada's misapplications of the law to the facts.

² Cape Cod has less effect on an equidistant line than does the protrusion south of the land boundary of the Nova Scotia peninsula. Cape Cod differs from other geographic features to which Canada would have the Court make a comparison.

Feature	Area	Population
Cape Cod, Nantucket Island & Martha's Vineyard	394 sq. mi.	147,925 (winter) 440,000 (summer)
Scilly Islands	6 sq. mi.	2,428
Kerkennah Islands	69 sq. mi.	12,600
Channel Islands	75 sq. mi.	125,290

³ The Pilgrims, regarded as New England's first permanent European settlers, landed on Cape Cod near Provincetown, before eventually settling at Plymouth. Nantucket Island was once the center of the world-wide whaling industry. Provincetown, at the tip of Cape Cod, was one of the leading fishing ports in Massachusetts during the 19th century. In 1797, Captain Paul Pinkham of Nantucket made the first chart concerned specifically with Georges Bank, shown at Figure 12 of the United States Memorial. The Woods Hole Oceanographic Institution on Cape Cod has sponsored much of the scientific research that has been conducted in the Gulf of Maine area, in addition to much of the oceanographic research conducted in other areas of the world. Today, approximately 150,000 people live the year-round on Cape Cod, Nantucket Island, and Martha's Vineyard. During the summer, the population swells to approximately one-half million people, more than half of the total population of the entire province of Nova Scotia. Although the area is smaller than that of the Nova Scotia peninsula, its economy is diversified and is not entirely dependent upon the tourist trade, as Canada asserts.

CHAPTER II

GEOMORPHOLOGY AND GEOLOGY

SECTION 1. Points of Agreement and Disagreement Between the United States and Canadian Memorials

35. The United States Memorial shows that there are four principal geomorphological features in the Gulf of Maine area—the Northeast Channel, Georges Bank, the Scotian Shelf, and the Gulf of Maine Basin ¹. Canada agrees with the United States depiction of the location and the dimensions of the geomorphological features in the Gulf of Maine area ². Similarly, the Canadian Memorial acknowledges that the subsurface geology in the area is essentially continuous, that it constitutes a single continental shelf, and that its principal structural trends parallel the coastline ³. The principal differences between the Parties lie in their characterizations of the relative significance of certain geomorphological features in the Gulf of Maine area, particularly the Northeast Channel and Georges Bank ⁴.

36. The United States Memorial confirms that the Northeast Channel, although not a disruption in the continental shelf sufficient to create two separate shelves, is the only significant break in the surface of the continental shelf in the Gulf of Maine area ⁵. The United States Memorial also shows that Georges Bank is an extension of the Atlantic Coastal Plain and East Coast Continental Shelf of the United States into and under the sea ⁶. Canada, on the contrary, suggests that there is no distinction to be drawn between the Northeast Channel and other features of the area,

¹ United States Memorial, para. 30.

² The geomorphology of the Gulf of Maine area is described at paras. 30-35 of the United States Memorial. Canada discusses it at paras. 23-25 and 64-73 of its Memorial.

³ The geology of the Gulf of Maine area is described at paras. 36-37 of the United States Memorial and at paras. 74-84 of the Canadian Memorial.

⁴ These and other, more technical differences relating to subsurface geology are addressed at Annex 5, The Geomorphology and Geology of the Gulf of Maine Area.

⁵ United States Memorial, para. 31.

⁶ United States Memorial, para. 32.

such as the Great South Channel¹. Canada also contends that Georges Bank is a detached bank, separated both from the Scotian Shelf and from the East Coast Continental Shelf of the United States. Canada in effect seeks to characterize Georges Bank as a topographic island².

SECTION 2. The Northeast Channel is One of the Principal Geomorphological Features in the Gulf of Maine Area, and is the Only Major Break in the Surface of the Continental Shelf in the Gulf of Maine Area, While the Great South Channel is Neither

37. The Northeast Channel represents one of only two prominent breaks in the surface of the entire Atlantic continental margin of North America, from Florida to beyond the Grand Banks of Newfoundland. The only other such break, the Laurentian Channel, separates the Scotian Shelf from the Grand Banks of Newfoundland, beyond the Gulf of Maine area. Canada does not contest either the actual size or the position of the Northeast Channel³. The Canadian Memorial does, however, characterize all geomorphological features in the Gulf of Maine area as "secondary"⁴, and it suggests that the Northeast Channel and Great South Channel are features of comparable significance⁵.

38. A comparison between the Northeast Channel and the Great South Channel serves only to emphasize the unique character of the Northeast Channel—as does Canada's own Figure 12 in the Canadian Memorial. Figure 4. The Northeast Channel is not a secondary geomorphological feature, and thus it should not be compared to the Great South Channel. Canada acknowledges that the Northeast Channel is more than three times as deep as the Great South Channel⁶. The charts used in the Canadian Memorial, which often depict the 60-fathom-depth contour to highlight the Great South Channel, confirm that the Northeast Channel cuts across the entire breadth of the continental shelf, while the Great South Channel does not⁷. Those charts also show that the Northeast Channel directly connects the continental slope to the floor of the Gulf of Maine Basin, while the Great South Channel does not.

¹ Canada regards the Northeast Channel as a "superficial" feature comparable with the Great South Channel. See Canadian Memorial, para. 68. Canada's own Figure 12, reproduced here as Figure 4, rebuts this Canadian position. Without the label, nothing on the map would suggest the presence of a channel.

² Canadian Memorial, paras. 2, 23, and 68.

³ The Canadian Memorial describes the Northeast Channel as being "about 250 metres deep" [para. 23]; the United States Memorial describes it as averaging 225 meters in depth, while reaching depths of 232 meters [para. 31].

⁴ Canadian Memorial, para. 64.

⁵ Canadian Memorial, para. 68.

⁶ Canadian Memorial, para. 23.

⑧ ⁷ See, in particular, Figure 8 of the Canadian Memorial.

39. The Northeast Channel has relatively steep, well-defined sides that give it a "U" shape¹, as Canada acknowledges. These sides mark the geomorphological boundary between Georges Bank and the Scotian Shelf. The Great South Channel is but a gently sloping depression that does not represent such a boundary, and, as Figure 12 from the Canadian Memorial confirms, it is imperceptible in comparison to the Northeast Channel. Figure 4.

40. The geomorphology of the Gulf of Maine area is confirmed by the
 (96) topographic chart at Figure 5, which depicts the gradients of the slopes in the area. The darker the color depicted, the steeper is the gradient in that area. The relatively steep gradient on both sides of the Northeast Channel appears in brown. There is no brown—i.e., there is virtually no gradient—
 (96) across the breadth of the Great South Channel². Figure 5 demonstrates that the Northeast Channel marks a geomorphological break in the continental shelf, while the Great South Channel does not.

SECTION 3. Georges Bank is an Extension of the Atlantic Coastal Plain and East Coast Continental Shelf, and is Not a Topographic Island as Canada Suggests

41. Georges Bank is not a "detached bank" between the Scotian Shelf and the East Coast Continental Shelf, as the Canadian Memorial asserts³. Indeed, Canada's own official relief diagram of the North American Atlantic continental margin, published by the Canadian Hydrographic Service and reproduced in pertinent part at Figure 6, depicts Georges Bank as an uninterrupted extension of the East Coast Continental Shelf of the United States.

42. The topography of Georges Bank resembles that of the continental shelf along the United States east coast and differs from that of the Scotian Shelf. Georges Bank is a broad, shallow, and continuous shelf, sloping gently seaward. It is capped by surficial sand features⁴. The

¹ It is important to recall the role of the glacial "scouring" of the Northeast Channel in giving the Channel its well-defined "U" shape, which Canada acknowledges at para. 71 of its Memorial. There is no evidence to suggest that a similar scouring of the Great South Channel took place, and, indeed, the available evidence indicates that it did not. The assertion to the contrary in para. 71 of the Canadian Memorial is incorrect. See Annex 5, para. 15.

² For further discussion of the Northeast Channel and the Great South Channel, see Annex 5, paras. 11-16. For a discussion of the effect of the Northeast Channel on the marine environment, see Chapter III of this Part; Part III, Chapter III, Section 4; and Annex 1, The Marine Environment of the Gulf of Maine Area.

³ Canadian Memorial, paras. 2 and 23.

⁴ United States Memorial, para. 33.

extensive sand ridges and waves present on Georges Bank are similar to those found on Nantucket Shoals and elsewhere on the East Coast Continental Shelf of the United States as far south as Cape Canaveral, Florida. These sand features resemble the sandy coastal topography of Cape Cod and of the islands of Nantucket and Martha's Vineyard. Although the continuum of sand wave topography is not interrupted by the Great South Channel, it does not extend across the Northeast Channel¹.

43. The Scotian Shelf, which lies northeastward of the Northeast Channel, has a different topography, reflecting extensive glacial erosion. The Scotian Shelf is composed of broad, flat-topped banks, separated by a series of basins carved by glacial activity. All but one of these banks, Sable Island Bank, lack significant surficial sand features².

44. As shown at Figure 6, taken from a chart of the Canadian Hydrographic Service, although the Northeast Channel "separates" Georges Bank from the Scotian Shelf, the Great South Channel does not interrupt the extension of the Atlantic Coastal Plain and East Coast Continental Shelf across Georges Bank³.

¹ For further discussion of the sandwave topography of Georges Bank and the East Coast Continental Shelf, *see* Annex 5, para. 6.

² For further discussion of the glacial topography of the Scotian Shelf, *see* Annex 5, paras. 7, 8, and 9.

³ For further discussion of Georges Bank as an extension of the Atlantic Coastal Plain and East Coast Continental Shelf, *see* Annex 5, paras. 6 and 16.

CHAPTER III

THE MARINE ENVIRONMENT

SECTION 1. Points of Agreement and Disagreement Between the United States and Canadian Memorials

45. The United States and Canada are in agreement on many of the characteristics of the three principal ecological regimes in the Gulf of Maine area and on the processes that create those regimes¹. In describing Georges Bank as a "semi-discrete marine ecosystem"², Canada generally agrees that the Bank and its superjacent waters constitute a separate and identifiable ecological regime. Canada agrees further that the Northeast Channel separates stocks of many commercially important species, and Canada acknowledges that there are separate stocks of important fish species associated with Georges Bank³. Canada also agrees

¹ The marine environment of the Gulf of Maine area is described at paras. 38-58 of the United States Memorial. Annex 1 of this Counter-Memorial, *The Marine Environment of the Gulf of Maine Area*, contains a more detailed analysis of this subject.

² Canadian Memorial, para. 89.

³ Canadian Memorial, para. 103. In its Memorial, the United States listed 16 commercially important species and described how 12 of these species were divided into stocks at the Northeast Channel. The Canadian Memorial and its supporting materials reflect that Canada agrees with the United States that at least 11 of these species are divided naturally at the Northeast Channel. Thus, Canada refers to separate Georges Bank stocks for five of the 12 species described by the United States in its Memorial at Figure 7 and paras. 55 and 57—cod, haddock, yellowtail flounder, Atlantic herring, and scallops (paras. 103 and 106). Canada also agrees that the Northeast Channel is the northern limit for loligo squid (para. 100). The report of the Canadian Department of the Environment, Fisheries and Marine Service, cited by Canada at para. 106, n. 27, and deposited with the Court, indicates that the Northeast Channel is a stock division for four more of these 12 species—silver hake, redfish, red hake, and white hake (pp. 2-4). In the same Canadian report, the Northeast Channel is shown to divide the lobster concentration on Browns Bank from that on Georges Bank (p. 8). It is not surprising that Canada recognizes the division at the Northeast Channel between stocks of these and other species. The stock division at the Northeast Channel long has been acknowledged. It was reflected in the North American Council on Fishery Investigations (NACFI) division of the Gulf of Maine area in 1926, and in the subsequent divisions of the area by the International Convention for the

(footnote continued on next page)

with the United States description of the basic pattern in which surface water flows through the Gulf of Maine area ¹. In this regard, Canada acknowledges that the Georges Bank gyre "helps to set Georges Bank off from immediately surrounding waters ²". Canada also recognizes the role of geomorphology in determining the circulation pattern, and the marine environment, of the Gulf of Maine area ³.

46. Apart from the large measure of agreement, however, there are important differences between the Parties. Throughout its presentation, Canada attempts incorrectly to link Georges Bank to the marine environment of the Scotian Shelf. Canada does not accept the southwesterly orientation of Georges Bank, which ties it directly to Nantucket Shoals and to the southern New England shelf. Canada describes incorrectly the entire offshore area from Newfoundland to Cape Cod-Nantucket Shoals as one "biogeographic province". The fundamental difference between the Parties in this respect stems from the fact that Canada ignores the role of the Northeast Channel in shaping the marine environment in the area ⁴.

(footnote continued from the previous page)

Northwest Atlantic Fisheries (ICNAF) and by the Northwest Atlantic Fisheries Organization (NAFO). See Figures 8 and 9 of the United States Memorial, Figures 14 and 15 of this Counter-Memorial, and the attachment to the letter of 20 January 1983 to the Registrar from the Agent of the United States, which was submitted in response to the letter of 15 December 1982 from the Agent of Canada. Annex 15, Vol. V. For further information on the stock divisions in the Gulf of Maine area, see Annex 1, Chapter II, Section 1.D, and Appendices A-H.

¹ Canadian Memorial, Figure 20. Canada agrees that water flows from the Scotian Shelf into the Gulf of Maine Basin, and round the Gulf of Maine Basin in a counterclockwise gyre. Canadian Memorial, paras. 91 and 93. Canada recognizes the existence of a clockwise gyre over Georges Bank separate from the counterclockwise gyre over the Gulf of Maine Basin. Canadian Memorial, paras. 91 and 93, and Figure 20.

² Canadian Memorial, para. 93.

³ Canadian Memorial, paras. 89 and 92.

⁴ Canadian Memorial, paras. 96, 97, 101, 102, and 108. "Biogeographic provinces" group species of flora and fauna in terms of shared geographic ranges, usually on the basis of climate. See Annex 1, Chapter II, Section 2, for further discussion of the science of biogeography.

⁵ Canada recognizes that the Northeast Channel has "a role in defining the limits of the Bank and hence the oceanographic and biological extent of its 'separation' from contiguous areas". Canadian Memorial, para. 107. Canada suggests, however, that the geomorphological feature that has the most effect on the marine environment of the Gulf of Maine area is the Bay of Fundy. Canadian Memorial, para. 92. As shown at Annex 1, Chapter III, the Northeast Channel has profound effects on the marine environment of the Gulf of Maine Basin and Georges Bank, which, contrary to Canada's assertions, the Bay of Fundy does not.

(24) (25)
(102) (103)

47. Finally, the United States and Canada differ in their views concerning the effects of a potential discharge of oil into the marine environment from possible hydrocarbon development on Georges Bank. The United States referred, in its Memorial, to the impact that such development might have on stocks of fish that range throughout Georges Bank¹. Canada overlooks the effect that hydrocarbon development on the northeastern portion of Georges Bank could have on those stocks throughout the Bank.

SECTION 2. The Separate and Identifiable Ecological Regime of Georges Bank is Associated with Nantucket Shoals and the East Coast Continental Shelf and Not with the Separate and Identifiable Ecological Regime of the Scotian Shelf

48. Canada purports to link Georges Bank to the Scotian Shelf. Canada also seeks to establish a break between Georges Bank and the East Coast Continental Shelf of the United States in the Cape Cod-Nantucket Shoals area, through reference to "biogeographic provinces"—broad groupings of *species* based upon climatological characteristics. On this basis, Canada asserts, in its Memorial that, there is a species (as distinct from a stock) division in the Gulf of Maine area: "the Cape Cod-Nantucket Shoals area off the United States coast is a recognized faunal and floral boundary"². Canada proceeds to contradict itself in Figure 21 of its Memorial, however, where it depicts Georges Bank as part of a "province" extending farther southwest, to Long Island. In alleging that there is some species break or division in the vicinity of Nantucket Shoals or Long Island, Canada misinterprets the work of current biogeographers³.

49. Contrary to Canada's assertions, to the extent that some scholars propose biogeographic divisions in the Gulf of Maine area near Cape Cod (as opposed to the division of fish stocks, which is widely recognized as occurring at the Northeast Channel), they support such a division at approximately 42 degrees North latitude, along the northern edge of Georges Bank and thence *through the Northeast Channel*—not through the Cape Cod-Nantucket Shoals area—as shown in Figure 7⁴.

¹ United States Memorial, paras. 255 and 321.

² Canadian Memorial, para. 97.

³ See Annex 1, Vol. I, Chapter II, Section 2.

⁴ Biogeographers usually indicate climatological barriers between groupings of species by reference to lines of latitude. The literature indicates that, in the Gulf of Maine area, such a barrier occurs at about 42 degrees N. Latitude. Most of Georges Bank is south of that latitude. While these works refer to Cape Cod as a reference point, they are careful to note that general references to Cape Cod include the Northeast Channel and the northern edge of Georges Bank. See Annex I, Vol. I, Chapter II, Section 2.

50. In Figure 7, reproduced from the work of Canadian scientists¹, the Gulf of Maine area is divided into four areas of zoogeographic significance, each of which is indicated by a different color. The line where the green and yellow meet indicates the limit of cold-water and warm-water regions. This limit runs along the northern edge of Georges Bank and through the Northeast Channel. Thus, even Canadian scientists do not regard Georges Bank as part of the same biogeographic province as the Scotian Shelf². There is no justification on the basis of biogeography for linking Georges Bank to the Scotian Shelf, or otherwise for supporting the Canadian line. To whatever extent biogeography may be relevant to this case, it supports the boundary the United States has proposed, rather than Canada's line.

SECTION 3. The Northeast Channel Shapes the Marine Environment of the Gulf of Maine Area

51. Canada suggests that the Northeast Channel has little or no role in shaping the marine environment of the Gulf of Maine area. Canada asserts incorrectly that the greater part of the water over Georges Bank comes from the Scotian Shelf³, when in fact most of the water on Georges Bank enters the Gulf of Maine area through the Northeast Channel. The water entering the area through the Northeast Channel, in turn, affects profoundly the physical characteristics of the waters in the Gulf of Maine Basin and on Georges Bank. Canada also implies that the Bay of Fundy is the "driving force" of the tidal phenomena in the Gulf of Maine Basin and over Georges Bank⁴, when in fact, without the Northeast Channel, the tidal energy in the Gulf of Maine Basin, over Georges Bank, and in the Bay of Fundy would be greatly reduced. Finally, Canada suggests incorrectly that the Great South Channel has some importance as a fish-species boundary⁵. In fact, it is the Northeast Channel that is

¹ E. L. Bousfield and M. L. H. Thomas, "Postglacial changes in distribution of littoral marine invertebrates in the Canadian Atlantic Region", in *Proceedings of the Nova Scotia Institute of Science*, Vol. 27, Supp. 3, 1975, p. 48. See Annex I, Vol. I, Chapter II, Section 2 and Appendix J thereto.

² For further discussion, see Annex 1, Chapter II, Section 2. The connection between Georges Bank and the areas to the southwest was also recognized by ICNAF. ICNAF Subarea 5, which included Georges Bank, extended as far south as 39 degrees north latitude, the approximate latitude of Washington D.C. ICNAF management measures frequently applied to Subarea 5 as a whole. Moreover, Subarea 5 and Statistical Area 6, which extended as far south as Cape Hatteras, North Carolina, were often treated as a single management unit. See Annex 3, Vol. II, paras. 15 and 16, Figure 3.

³ Canadian Memorial, paras. 91 and 96; see also para. 108.

⁴ Canadian Memorial, para. 92.

⁵ Canadian Memorial, paras. 99 and 101.

the only natural boundary in the Gulf of Maine area. The significance of the Northeast Channel in determining the marine environment of the Gulf of Maine area and in forming a natural boundary is discussed further in this Section, in Annex 1, and in Part III, Chapter III, Section 4, which deals with Canada's misapplications of the law to the facts.

A. THE NORTHEAST CHANNEL DETERMINES THE CIRCULATION PATTERN OF THE WATER IN THE GULF OF MAINE BASIN AND ON GEORGES BANK

52. The greater part of the water over Georges Bank comes from the water in the Gulf of Maine Basin, which in turn comes from water entering through the Northeast Channel. Approximately 60 to 70 per cent of the water in the Basin enters it through the Northeast Channel¹. Less than five per cent of the water entering the Basin is from fresh water sources²; only the remainder comes from the Scotian Shelf. Thus, the Northeast Channel is the principal source of water for Georges Bank.

53. The water entering the Gulf of Maine Basin through the Northeast Channel is important not only because of its volume. As the water enters the Basin through the Northeast Channel, some of it moves northward toward the Bay of Fundy, and the remainder moves westward toward the New England coast. This flow plays a critical role in the formation of the counterclockwise gyre in which the water of the Gulf of Maine Basin moves. As the water entering through the Northeast Channel flows into the deeper portions of the Gulf of Maine Basin, it lifts the upper, less dense layers of water. Some deep water upwells onto the Bank, where, coupled with tidal action, it sets in motion the clockwise gyre³. The remainder of the water leaves the Basin in a well-defined current that wraps around the northern and eastern edges of Georges Bank.

B. THE NORTHEAST CHANNEL DETERMINES THE PHYSICAL CHARACTERISTICS OF THE WATERS OF THE GULF OF MAINE BASIN AND OF GEORGES BANK

54. The water entering the Gulf of Maine Basin through the Northeast Channel is of a relatively constant temperature, and is more saline and

(22) ¹ See Annex 1, Chapter I, Section 2.A. *See also* United States Memorial, Figure 5. Approximately 276,000 cubic meters of water per second enter the bottom of the Gulf of Maine Basin through the Northeast Channel.

² See Annex 1, Chapter I, Section 2.A. Two-thirds of this fresh water is from precipitation. Only some 0.6 per cent of the water in the Gulf of Maine is from river inflow. Roughly two-thirds of this (approximately 0.4 per cent) is from United States rivers and one-third (approximately 0.2 per cent) is from the Bay of Fundy and Nova Scotia.

³ Canada acknowledges the existence of the gyre on Georges Bank at para. 93 of its Memorial. For further discussion, *see* Annex 1, Chapter I, Section 2.B.

richer in nutrients than is the water that enters the Basin at the surface from the Scotian Shelf. The infusion of water through the Northeast Channel into the Gulf of Maine Basin has a profound effect on the temperature, salinity, and vertical mixing of the waters in the Basin. As a result, these waters are substantially different from the waters over the Scotian Shelf. In turn, the physical characteristics of the waters above Georges Bank, which originate in the Basin, are substantially different from those of the waters over the Scotian Shelf¹. These physical differences result in the development of different ecological communities within the three regimes.

C. THE NORTHEAST CHANNEL ENHANCES THE TIDES OF THE GULF OF MAINE BASIN AND OF GEORGES BANK

55. The Northeast Channel greatly enhances the tides in the Gulf of Maine area. Tides are the result of the gravitational pull of the moon and the sun upon the ocean. Although this gravitational pull is exerted evenly on the waters of the Gulf of Maine area, the geomorphology of the area affects the ebb and flood of the water. Thus, the three separate and identifiable ecological regimes in the area are affected differently by tides². The Northeast Channel permits a greater volume of water to be pulled by tidal forces, and it permits deeper water, rather than surface water alone, to be affected by these forces. Furthermore, the tidal energy entering the Gulf of Maine Basin through the Northeast Channel is greater than the tidal energy entering the Bay of Fundy from the Gulf of Maine Basin³. As a result, the tides in the Gulf of Maine Basin, as well as those in the Bay of Fundy, are "greatly enhanced" by the Northeast Channel, and not merely by the Bay of Fundy itself, as Canada suggests⁴.

D. THE NORTHEAST CHANNEL SEPARATES FISH STOCKS WITHIN THE GULF OF MAINE AREA

56. Because of the effect of the Northeast Channel on the circulation and characteristics of the waters of the Gulf of Maine area, separate and

¹ For further discussion, see Annex 1, Chapter I, Section 2.

² The interaction of tidal currents with shallow topography enhances marine plant production.

³ "Most of the tidal energy enters the system through the Fundian [Northeast] Channel." D. A. Greenberg, "A Numerical Model Investigation of Tidal Phenomena in the Bay of Fundy and Gulf of Maine", in *Marine Geodesy*, Vol. 2, No. 2, 1979, p. 185; cited at Canadian Memorial, para. 92, n. 16, and deposited with the Court by Canada on 27 September 1982 pursuant to Article 50(2) of the Rules of Court. For further discussion, see Annex 1, Chapter I, Section 3.

⁴ Canadian Memorial, para. 92. For further discussion, see Annex 1, Chapter I, Section 3.

identifiable communities of flora and fauna are associated with the three separate and identifiable ecological regimes of the area. Distinct communities of marine flora and fauna are found within each regime. Thus, separate stocks of commercially important fish and shellfish, such as cod, haddock, herring, lobster, yellowtail flounder, and silver hake, to mention only a few, are associated with the principal ecological regimes of the area¹.

SECTION 4. Hydrocarbon Development on the Northeastern Portion of Georges Bank Would Place the Marine Resources of the Entire Bank at Risk; Such Development Would Not Threaten Canadian Stocks on the Scotian Shelf or the Canadian Coast

57. An oil-well "blowout" or an oil spill on the northeastern portion of Georges Bank during the course of any hydrocarbon development would threaten the stocks of fish and shellfish throughout the entire Bank. Because Georges Bank is an integrated ecological regime, damage to the marine environment on the northeastern portion of Georges Bank would affect adversely the entire regime². By contrast, it is unlikely that hydrocarbon development on the northeastern portion of Georges Bank would threaten significantly the marine resources of the Scotian Shelf or the Canadian coast, as is confirmed in Annex 2 of this Counter-Memorial³.

¹ For further discussion, see Annex, Vol. I, which describes in detail the stock divisions at the Northeast Channel among the commercially important fish species in the Gulf of Maine area. See, in particular, Chapter II, Section 1.C and Appendices A-H.

² For further discussion, see Annex 2, Vol. I.

³ For further discussion, see Annex 2, Vol. I.

CHAPTER IV

FISHING ACTIVITIES OF THE PARTIES AND THEIR NATIONALS

SECTION 1. Points of Agreement and Disagreement Between the United States and Canadian Memorials

58. The fishing activities of the Parties and their nationals are described at paragraphs 60 through 88 of the United States Memorial. There are several points of agreement with the description contained in the Canadian Memorial¹. Canada agrees that the United States has historically fished off Canadian coasts throughout the Gulf of Maine area and beyond²; that the United States first began to fish on Georges Bank in the early 19th century³; and, that United States fishermen fish today on Georges Bank⁴. Finally, Canada agrees that its fishing activity on Georges Bank is limited, both in geographical scope to the northeastern portion of the Bank and, in terms of species, primarily to scallops found in that area⁵. As Canada states, “[t]he Canadian interest has been centred primarily on the scallops of the area under Canadian claim. . . .”⁶.

59. For the most part, however, the United States and Canadian Memorials bear little resemblance to each other in their discussion of fishing activities. The United States Memorial demonstrates that, on Georges Bank and in the Gulf of Maine Basin, United States fishermen have fished longer and to a much greater extent⁷; that it was United States fishermen alone who established the fisheries on Georges Bank, beginning over 150 years ago⁸; and, that, until recently, it was almost exclusively United States fishermen who fished Georges Bank⁹. The United States Memorial also establishes that the United States has dominated the conservation, management, and scientific research efforts

¹ Canadian Memorial, paras. 179-196.

² See “Historical Introduction”, Canadian Memorial, Annexes, Vol. I, p. 1.

³ Canadian Memorial, para. 181.

⁴ Canadian Memorial, paras. 176-178.

⁵ Canadian Memorial, paras. 117, 126, 129, 132, and 202.

⁶ Canadian Memorial, para. 140.

⁷ United States Memorial, paras. 68-85.

⁸ United States Memorial, para. 69.

⁹ United States Memorial, paras. 76-79.

relating to the fisheries of Georges Bank and the Gulf of Maine Basin, both independently and pursuant to international agreements¹. The Canadian Memorial distorts Canada's purported historical fishing "interest" on Georges Bank, and, indeed, attempts to describe one when in fact none exists.

60. Canada also is mistaken in its portrayal of the United States fishing interest in Georges Bank. For example, Canada suggests incorrectly that the United States interest in the northeastern portion of Georges Bank is not important²; that fishermen from Maine and New Hampshire have no historical or present fishing interest in Georges Bank³; and, that the role of the United States in the conservation and management of the Georges Bank fisheries has not in the past, and does not now, exceed that of Canada⁴. In fact, with respect to each of these matters, the converse is true. United States fishermen have always taken a substantial share of their catch from the northeastern portion of Georges Bank. Fishermen from Maine and New Hampshire have in the past, and do at present, fish on the Bank, including on the northeastern portion. Finally, the United States has been the leader in the efforts to conserve and to manage the fishery resources of Georges Bank.

SECTION 2. Georges Bank was Developed and Fished Almost Exclusively by the United States; the Canadian Fishery on Georges Bank is Limited and of Recent Origin.

A. THE GEORGES BANK FISHERY WAS DEVELOPED BY THE UNITED STATES IN THE EARLY PART OF THE NINETEENTH CENTURY, AND FISHED ALMOST EXCLUSIVELY BY THE UNITED STATES PRIOR TO THE SECOND HALF OF THIS CENTURY

61. The discussion of the development of the United States fishery on Georges Bank contained in the United States Memorial is supported by the works of eminent historians, such as Raymond McFarland, George Brown Goode, Samuel Eliot Morison, and Harold A. Innis⁵. Moreover, (97) this portrayal is supported by the statistical record. Figure 8 shows total United States and Canadian groundfish landings by weight in Subarea 3 (off Newfoundland), Subarea 4 (off Nova Scotia), and Subarea 5 (off New (97) England) for the years 1893 through 1950. Figure 8 was developed from information supplied by the United States and Canada to the International Commission for Northwest Atlantic Fisheries (ICNAF) in 1951 and

¹ United States Memorial, paras. 121-128.

² Canadian Memorial, para. 138.

³ The Canadian Memorial is replete with such incorrect statements. See, e.g., Canadian Memorial, paras. 32, 35, 59, 61, 120, and 176.

⁴ Canadian Memorial, paras. 197-199.

⁵ United States Memorial, Annexes 17, 18, 12, and 13, respectively, Vol. II.

reported in Part 4 of ICNAF's *Second Annual Report*¹. Canada reported to ICNAF catches in Subarea 3 and 4 dating as far back as 1869². No Canadian landings are reported in Subarea 5 (off New England) until after 1950. These statistics illustrate that Canada's fishing activities always have centered on the major fishing banks to the north of the Northeast Channel.

62. Nonetheless, Canada argues that it had a fishery on Georges Bank in the 19th century³. Annex 7, "Comments on Paragraphs 179 through 196 of the Canadian Memorial", contains a paragraph-by-paragraph rebuttal of Canada's assertions in this regard. Annex 7 shows that Canadian fishing on Georges Bank in the 19th century, if it existed at all, was at most insignificant and incidental.

63. In the first half of the 20th century, the fishery on Georges Bank still was pursued almost exclusively by the United States. The North American Council on Fishery Investigations (NACFI), in which Canada and the United States participated, was formed during this period. It divided the North Atlantic fishing area into "Statistical Areas" based upon what was known at the time about stock divisions and areas of fishing concentration. In the Gulf of Maine area, NACFI drew a line through the Northeast Channel, between Georges Bank and Browns Bank, labeling Georges Bank and the Gulf of Maine Basin as "New England" and German Bank, Browns Bank, and the banks to the northeast as "Nova Scotia"⁴. That nomenclature reflected the historical and contemporary interests of the United States and Canada at that time. In 1949, the International Convention for the Northwest Atlantic Fisheries (ICNAF) adopted this division, dividing its Subarea 4 (off Nova Scotia) and Subarea 5 (off New England) with a line between Browns Bank and Georges Bank through the Northeast Channel⁵.

64. Contrary to the information that it supplied to ICNAF, Canada now claims that its fleets fished regularly on Georges Bank in the first part of the 20th century⁶. Canada fails to provide any statistical

¹ "Statistics of Landings of Groundfish from the Convention Area", Part 4, ICNAF, *Second Annual Report*, 1951-52. See Annex 16, Vol. V. See also, *ICNAF Statistical Bulletin*, Vol. 2 for the year 1952, at United States Memorial, para. 79 and Annex 46, Vol III.

² Newfoundland's catches were reported as far back as 1804. Annex 16, Vol. V.

³ Canadian Memorial, paras. 179-182.

(24) (102) ⁴ United States Memorial, para. 76, Figure 8; see also Figure 14.

(25) (103) ⁵ United States Memorial, para. 78, Figure 9; see also Figure 15. The ICNAF line also placed virtually the entire Gulf of Maine Basin within Subarea 5.

⁶ Canadian Memorial, paras. 183-189.

information to support that contention. As was the case in the 19th century, to the extent that any Canadian vessels fished on Georges Bank during the first half of the 20th century, these were but insignificant and incidental occurrences. As noted by Annex 7, the only contemporaneous corroboration that Canada supplied in its Memorial in support of its contention is one obscure 1915 newspaper article from Digby, Nova Scotia, and one isolated 1942 wartime wreck report¹.

- (97) 65. Figure 8, which shows the catches reported by the United States and Canada for the years 1893 through 1950, confirms that there were no Canadian fisheries in Subarea 5 up to the middle of this century. Figure 8 illustrates the United States catch in Subarea 3, as well as the large Canadian catch in that area. It illustrates that both the United States and Canada had substantial catches in Subarea 4. Finally, it illustrates that the United States was the only State that reported catches in Subarea 5.

66. The meager evidence provided by Canada in its Memorial does not support its contention that Canadian fleets regularly fished Georges Bank (a part of Subarea 5) prior to the second half of this century. As shown in Annex 7, Canada's allegation is contradicted by the work of Frederick William Wallace, the editor of the *Canadian Fisherman*, Canada's leading fishing industry publication during that period². In 1945, Mr. Wallace, upon whom Canada relies in its Memorial³, wrote a comprehensive article entitled "Thirty Years Progress in Canada's Fish Industry 1914-1944"⁴. In that article, he noted the fact that the Canadian offshore fleet:

"... prosecuted the cod, haddock and halibut fisheries on all the offshore Banks from Browns to Grand, and the inshore grounds from the Bay of Fundy to Labrador"⁵.

¹ Annex 7, Vol. IV, contains comments on paras. 185 and 189 of the Canadian Memorial. The obscure newspaper article is cited in the Canadian Memorial at p. 85, n. 49. The wreck report is cited at p. 87, n. 56. By way of illustration of the insubstantiality of this evidence, in contrast to the single wreck report cited by Canada, Annex 7 indicates that in a survey of United States Customs Service records, which is only about 30 per cent complete, 319 wreck reports of United States vessels fishing on Georges Bank, or sailing to or from the Bank, have been identified to date.

² See Annex 7, Vol. IV, commenting, on paras. 184, 187, and 189, *inter alia*, of the Canadian Memorial.

³ Canadian Memorial, p. 85, n. 47 and 48. See also p. 84, n. 46, and p. 86, n. 53.

⁴ Frederick William Wallace, "Thirty Years Progress in Canada's Fish Industry 1914-1944", in *Canadian Fisheries Manual*, 1945. Annex 7, Vol. IV, Appendix A.

⁵ *Ibid.*, p. 14. [Emphasis added.]

Nowhere, however, does he mention a Canadian fishery on Georges Bank. It can only be assumed that this leading reporter on Canadian fisheries was unaware of any Canadian fishing activity on Georges Bank prior to 1945.

B. IN THE SECOND HALF OF THIS CENTURY, THE THERETOFORE EXCLUSIVE UNITED STATES FISHERY ON GEORGES BANK WAS SUBJECT TO THE INCURSION OF FOREIGN FISHING, INCLUDING FROM CANADA

67. The United States Memorial established four points in relation to fishing activities on Georges Bank in the second half of this century. First, fishing on Georges Bank was conducted almost exclusively by the United States until 1954, the first year in which ICNAF recorded any Canadian fishing activity on the Bank ¹. Second, foreign States other than Canada began to fish Georges Bank in 1961, and within a few years were taking more than 50 per cent of the catch from the Bank. In some cases, these catches threatened the viability of the stocks ². Third, during this period, Canada concentrated on the scallop fishery on the northeastern portion of Georges Bank as the scallop catch of United States vessels on Georges Bank declined ³. Fourth, because of overfishing by foreign fleets, the United States established a 200-nautical-mile fishing zone in 1977 ⁴.

68. Since Canada began to fish on Georges Bank in the mid-1950s, its activities have centered primarily on the scallops on the northeastern portion of the Bank ⁵. In the 1960s and 1970s, however, Canada entered a number of other fisheries on Georges Bank, as did third States. Table A ⁶.

69. Canada's participation in the non-scallop fisheries was often limited or transitory, and followed the development of the fishery by others. For instance, Canada did not enter the offshore lobster fishery on Georges Bank until the 1970s, after that fishery had been developed by the United States ⁷. In another example, Canada, in the wake of the Soviet Union,

¹ United States Memorial, para. 80.

² United States Memorial, para. 84. The Canadian Memorial, at para. 191, refers to the "virtual extinction of the Georges Bank herring stock" brought about by overfishing by the distant-water fleets.

³ United States Memorial, para. 83.

⁴ United States Memorial, para. 87.

⁵ Canadian Memorial, para. 140.

⁶ In this table, the Canadian catch includes scallop catches by shell weight. Thus, the Canadian catch in metric tons is larger than it would be if the table reflected scallop catches by meat weight.

⁷ Annex 7, Vol. IV, contains comments on para. 191 of the Canadian Memorial.

entered the offshore herring fishery in the years 1967 through 1974¹. The groundfish fishery, which Canada entered in the late 1950s, was begun by the United States in the early 19th century.

70. The non-scallop catch of the United States and Canada on Georges Bank from 1904 to 1981 is shown at Figure 9². Canada's catch was insubstantial until 1962, when for the first time it was more than 5 per cent of the total United States-Canada non-scallop catch. After the establishment of 200-nautical-mile zones in 1977, during active negotiations to resolve the boundary dispute, Canada's groundfish catches rose abnormally. For instance, in the case of haddock, Canada's catch in 1977 and 1978 on the northeastern portion of Georges Bank exceeded its total haddock catch in that area for the entire period of 1969 through 1976³.

71. In view of this historical record, it is not surprising that Canada emphasizes the 10-year period 1969 through 1978. Canada states "[t]his period has been selected as one that is long enough to convey a representative picture that avoids distortions resulting from short-term fluctuations, yet short enough to focus attention upon the contemporary reality of the fishery". In fact, this period suffers from the very distortions that Canada argues it avoids. From 1969 through 1978, Canada caught more fish on Georges Bank than in any other comparable period prior to that time. Inasmuch as there was no recorded Canadian fishery on Georges Bank prior to 1954, no 10-year period since that date can be termed "representative".

72. Canada's suggestion that it started the scallop fishery on Georges Bank, and its assertion that there was "a 'virtual abandonment' of eastern Georges Bank" by the United States scallop fleet in the mid-1960s, are incorrect. Canada's own evidence confirms that the United States, and not Canada, established the scallop fishery on Georges Bank. Bulletin No. 145 of the Fisheries Research Board of Canada⁴, published in 1964,

¹ Annex 7, Vol. IV.

98 ² Figure 9 is developed from information presented at Annex 17, Vol. V.

³ Annex 18, Vol. V, which is based upon information contained in Annex 3, Volume 4, of the Canadian Memorial, shows the abnormal increases in Canadian groundfish catches on the northeastern portion of Georges Bank during the years 1977-1978. To the extent that there were conservation problems with Georges Bank stocks in 1977-78, as Canada seems to allege at para. 236 of its Memorial, these statistics indicate that Canada contributed substantially to that problem.

⁴ Canadian Memorial, para. 122.

⁵ Canadian Memorial, para. 190. The United States Memorial discusses the scallop fishery at paras. 82 and 83.

⁶ N. Bourne, *Scallops and the Offshore Fishery of the Maritimes*, Fisheries Research Board of Canada, Bulletin No. 145, 1964. This document is cited at para. 190, n. 57, of the Canadian Memorial.

**CANADA AND THIRD STATE CATCHES ON GEORGES BANK
AS REPORTED TO ICNAF* (in metric tons)**

TABLE A

	CANADA	USSR	POLAND	SPAIN	FRG ¹	JAPAN	GDR ²	OTHER
1954	1148							
1955	1388							
1956	3391							
1957	0							
1958	12,294							
1959	19,696							
1960	28,905							
1961	38,806	68,251						140
1962	54,428	209,370	565					
1963	70,147	224,553						
1964	74,301	335,930	723	22				1050
1965	67,492	500,686	4543	69				3081
1966	82,497	456,358	16,103	9531				5759
1967	73,827	267,924	41,264	16,250	28,288			23,654
1968	77,778	170,858	76,808	17,713				53,388
1969	52,672	102,466	50,963	15,024	60,909			13,542
1970	42,100	93,674	96,902	7692	83,244	5357		2176
1971	53,313	173,380	100,968	7835	54,742	13,029		34,026
1972	40,222	304,652	94,465	10,785	28,384	11,009	56,754	17,444
1973	47,562	255,605	101,398	9017	32,507	8014	77,729	12,737
1974	56,920	202,275	66,694	14,148	23,533	9674	37,464	10,692
1975	70,081	214,379	64,888	6533	25,031	5738	50,326	19,144
1976	87,816	126,319	38,770	4229	14,170	4431	10,449	13,495

1. Federal Republic of Germany

2. German Democratic Republic

*Taken from ICNAF Statistical Bulletins, 1954—1976 Table 2. See Annex 47, Volume III United States Memorial. Note that through 1967 ICNAF did not break down catch statistics between Georges Bank (5ZE) and the Nantucket Shoals Area (5ZW). Accordingly, the catches shown here for 1967 and prior years include both areas.

notes that when Canadian vessels began to fish for scallops on Georges Bank, they were entering an established United States scallop fishery. That document, an official publication of a Canadian Government institution, states: "... the thriving United States offshore scallop fishery ... began off Long Island in the early 1920's and spread to Georges Bank in the late 1920's and early 1930's ¹". The so-called "pioneer voyage" of the *Mary E. Kenney*, upon which Canada so heavily relies at paragraph 190 of its Memorial, is also referred to by the Fisheries Research Board of Canada:

"... in the late 1930's interest was expressed in developing a Canadian offshore fishery and necessary alterations in the fishery regulations were proposed to permit this. However, with the advent of World War II, interest was diverted.

A great deal of the credit for reviving interest and encouraging the development of the Canadian offshore scallop fishery must go to the late Mr. T. R. Clouston, of General Sea Foods, Halifax. *He knew of the United States Georges Bank fishery* and postulated that some of the Nova Scotian banks had populations of scallops which might support a similar Canadian fishery. In 1945 he chartered the M. V. *Mary E. Kenney* (under Captain John Beck of Halifax) to explore for scallop beds on Nova Scotia banks, particularly Middle Ground.

Captain Beck was acquainted with offshore scalloping since he had sailed on Georges Bank scallop boats out of the port of New Bedford, Massachusetts. *In 1945 he took the Mary E. Kenney to New Bedford and had her rigged in the same manner as United States offshore scallopers.* On his return trip to Halifax, he fished 9 days on Georges Bank and with his crew of 6 men landed 8000 lb of scallop meats in Halifax. This was the first catch of scallops landed in Canada by an offshore scalloper and it came from Georges Bank ²."

73. Thus, in one of Canada's own official reports, the voyage of the *Mary E. Kenney* is proven not to have been "pioneer" at all, but rather a tentative first step into a fishery known by Canada to have been developed by United States fishermen at great expense and personal risk ³.

74. Furthermore, the United States scallop fleet, contrary to Canada's claim, at no time abandoned the northeastern portion of Georges Bank. The Canadian scallop fleet entered a fishery that was already fully

¹ Bourne, *op. cit.*, p. 21.

² *Ibid.* [Initial and final emphasis added.]

³ See also Annex 7, Vol. IV, containing comments on para. 190, *inter alia*, of the Canadian Memorial.

utilized by the United States¹. Nevertheless, due in large measure to the vessel-construction subsidy program of the Canadian government², by 1964, the new and expanding Canadian scallop fleet on Georges Bank was taking about one-half of the scallops from the Bank. Figure 10³. Until that year, the United States scallop fleet had been able to maintain its traditional catch levels despite the entry of the Canadian fleet. This was possible because of an unusually large year class bred in 1959⁴. In 1965, however, scallop availability declined. Both the United States and Canadian scallop fleets shifted much of their effort to scallop beds on the mid-Atlantic Shelf⁵. After two years, the Canadian fishermen returned to Georges Bank⁶, while the United States fleet continued to concentrate on the mid-Atlantic scallop beds⁷.

75. Scallops on Georges Bank remained at low levels of abundance through 1975, but nonetheless were fished heavily by the Canadian fleet⁸. A proposal was made in ICNAF in 1972 to conserve the scallop resource by requiring the scallop catch to average not more than 40 meats

¹ J. F. Caddy and E. I. Lord, "High Price of Scallop Landings Conceals Decline in Offshore Stocks", Fisheries of Canada, Dept. of the Environment, May-June 1971, Vol. 23, No. 5, *reprinted at* Annex 19, Vol. IV. As explained by these Canadian writers, the unusually high abundance of scallops on Georges Bank in the early 1960s "set the pace for the Canadian investment in the offshore scallop industry". *Ibid.*, p. 4.

² Annex 4, Vol. III, A Factual Analysis of the Socio-Economic Arguments in the Canadian Memorial, at Appendix C. *See also* United States Memorial, para. 82 and Annex 21.

³ Figure 10 is developed from information presented at Annex 17, Vol. V.

⁴ Caddy and Lord, *op. cit.*, at Annex 19, Vol. V, p. 4.

⁵ *Ibid.*

⁶ *Ibid.*

⁷ Even at that time, United States fishermen continued to fish for scallops on all parts of Georges Bank, and thus did not "abandon" the Bank. *See* Figure 10.

⁸ *See* J. F. Caddy, "Some Recommendations For Conservation of Georges Bank Scallop Stocks", ICNAF Res. Doc. 72/6, at Annex 19, Vol. V. Caddy reports that parts of the Canadian fleet were taking scallops yielding 70 meats per pound. He also cites unconfirmed reports of Canadian catches of 120 meats per pound (p. 3). In the late 1960s and early 1970s, Canadian scallop vessels were able to operate economically while fishing for such small scallops because of low operating costs (p. 1). United States scallop vessels, which operate under union rules or identical industry practices, have higher costs. Those rules and practices limit the number of persons on board the vessel and the number of days the vessel may be away from port. Since United States vessels have fewer fishermen to shuck scallops and fewer days when they may be away from port, they tend to seek out larger scallops. These union rules and industry practices thus have important conservation benefits.

per pound, thus compelling fishermen to return small scallops to the sea¹. This proposal, however, did not enter into effect for the United States or Canada². In 1976, the period of low scallop availability on Georges Bank ended with the maturity of the large 1972 year class. This factor, combined with the extension of fisheries jurisdiction to 200 nautical miles in 1977, encouraged the return of large numbers of United States scallop vessels to Georges Bank. Figure 10.

(99)

76. In conclusion, between 1950 and the 1977 extension of fisheries jurisdiction to 200 nautical miles, the scope of Canadian fishing activities on Georges Bank did not differ significantly from that of third States, in terms of either its duration or the amount of fish taken from the Bank. The Canadian activity was centered primarily on the scallop fishery, which was started, and never abandoned, by the United States. Through the extension of its fisheries jurisdiction in 1977, the United States was able to control fishing by third States on Georges Bank. By virtue of its boundary claim, however, Canada asserted a right to a portion of Georges Bank. To avoid incidents the United States has permitted Canadians to fish in the area pending resolution of the dispute. Should any credence be accorded to Canada's claim, it would disregard the historical predominant interest of the United States in the fisheries of Georges Bank. Canada's limited fishing activities on Georges Bank are no more entitled to prevail over the past and present United States fishing interest than were the Norwegian activities on the Grisbadarna Bank in the *Grisbadarna* case or the British activities in the waters off Norway in the *Anglo-Norwegian Fisheries* case. This result is discussed further in Part III, Chapter III, Section 5, which deals with Canada's misapplications of the law to the facts.

SECTION 3. A Division of Georges Bank Would Deny United States Fishermen Access to the Northeastern Portion of Georges Bank, an Area of Past and Present United States Interest

77. Canada incorrectly portrays the United States interest in Georges Bank as "predominantly centred in the undisputed fishing grounds"³, i.e., southwest of the Canadian line. United States fishermen, both historically and at present, fish on all parts of Georges Bank.

¹ ICNAF, Proceedings of the 22nd Annual Meeting, No. 7, App. IV.

² Canada initiated this proposal, and it was adopted by Panel 5. Nonetheless, during the six-month objection period under the Convention (see Annex 3, Chapter II), Canada refused to be bound by the proposal. Thereafter, the United States also refused to be bound, to avoid being placed at a competitive disadvantage in its own market.

³ Canadian Memorial, para. 138.

78. For more than a century, the northeastern portion of Georges Bank has retained a special importance in the fishing strategy of United States fishermen. The concentrations of groundfish in this area during the winter months make large catches possible at a time when prices are high¹. Furthermore, the scallop beds in the northeastern portion of Georges Bank are the most consistently productive beds to which the United States scallop fleet has access. When the scallop population in that area is low, the United States scallop fleet has not been able to maintain its catch elsewhere, and vessels have had to leave the fishery.

79. The historic record demonstrates that United States fishermen conducted substantial fisheries on the northeastern portion of Georges Bank in the 19th and early part of the 20th centuries. George Brown Goode, in *The Fisheries and Fishery Industries of the United States*, published in 1887, referred to the United States cod fishery on Georges Bank in the following terms:

“The best time for fishing upon George’s is in February, March, and April, when the spring spawning schools of codfish appear on the Bank. During these months the favorite fishing ground is upon that portion of the Bank which lies east of the shoals, at a depth of 25 to 35 fathoms, this being called the ‘winter fishing ground’².”

Elsewhere, Goode states:

“During the months of February, March, and April large schools of cod make their appearance on the bank. They are generally found on the ‘winter fishing-ground,’ as part of the bank lying to the eastward of the shoals³.”

Thus, the northeastern portion of Georges Bank is the famed “winter fishing grounds” that still appear on United States charts⁴. Goode’s chart

¹ For a discussion of the relationship between fishing patterns and stock concentrations, see Part III, Chapter III, Section 7.

² G. B. Goode, “The Georges Bank Cod Fishery”, in *The Fisheries and Fishery Industries of the United States*, Section V, 1887, p. 189. [Emphasis added.] Reprinted at United States Memorial, Annex 18, Vol. II. The shoals referred to are Georges shoals, on the central part of Georges Bank.

³ G. B. Goode, “The Fishing Grounds of North America”, in *The Fisheries and Fishery Industries of the United States*, Section III, 1887, pp. 74-75. Annex 21, Vol. V.

⁴ Under Article II, paragraph 2, of the Special Agreement, the Chamber is requested to depict the course of the maritime boundary on Canadian Hydrographic Service Chart No. 4003 and United States National Ocean Survey Chart No. 13006. The “Winter Fishing Ground” is still labeled as such on the northeastern portion of Georges Bank on United States National Ocean Survey Chart No. 13006.

- depicting the winter cod grounds on the northeastern portion of Georges Bank is reproduced here at Figure 11. Other charts, produced in the early 20th century by Edward Ackerman of Harvard University, and published in his work *The New England Fishing Industry*¹, portray the heavy concentration of the New England cod and haddock catches on the northeastern portion of Georges Bank. Figure 12.

80. Statistics compiled since 1936 confirm that the United States has consistently taken a large share of its Georges Bank catch from the northeastern portion of the Bank². United States catches in the northeastern portion of Georges Bank for the years 1936 through 1968 are shown at Table B, together with the total United States Georges Bank catch for those same years³. Table B shows that the percentage of the total United States Georges Bank catch taken from the northeastern portion of the Bank has ranged from 62 to 14 per cent, depending upon the fishing conditions in any particular year. Canada acknowledges that, even during the unrepresentative period of 1969 through 1978 that Canada asserts is the most relevant, 27 per cent of the United States Georges Bank catch came from the northeastern portion of the Bank⁴.

81. These tables, figures, and historical evidence demonstrate that the United States fishing industry has caught in the past, and catches at present, a large share of its catch from the northeastern portion of Georges Bank⁵. Thus, Canada is not correct in its statement that the "undisputed part of Georges Bank gives the United States an ample resource base to sustain a healthy fishery and allow potential for future growth"⁶. If that were the case, United States fishermen would not have

¹ E.A. Ackerman, *New England's Fishing Industry*, 1941, Charts III and IV, pp. 15, 17.

² Statistics are available from 1936 to the present indicating United States catches in NACFI statistical units 523 and 524, which correspond to ICNAF statistical units 5Zej and 5Zem, shown at Figure 23 of the Canadian Memorial. Canada has correlated these statistical units to the area that it claims on Georges Bank. See Canadian Memorial, para. 138. For purposes of statistical comparison only, the United States uses this approach.

³ This table is developed from landings at principal New England ports (primarily Boston, Gloucester, Portland, and New Bedford), as reported in *Fishery Industries of the United States, 1937-1938*, U.S. Dept. of Commerce, and *Fishery Statistics of the United States, 1939-1968*, U.S. Dept. of the Interior. Accordingly, it does not include all United States catches from Georges Bank. Nonetheless, it is consistent with, and representative of, the record of the United States catch in the area.

⁴ See Canadian Memorial, para. 138, n. 18.

⁵ For a comparison of Canada's catch on the northeastern portion of Georges Bank with its total catch in the Northwest Atlantic, see Annex 22, Vol. V.

⁶ Canadian Memorial, para. 140.

been fishing on the northeastern portion of Georges Bank for more than 150 years¹.

SECTION 4. Fishermen From Maine and New Hampshire Have Historical and Present Fishing Interests On Georges Bank

82. The Canadian Memorial, in numerous instances, asserts that fishermen from the states of Maine and New Hampshire do not fish on Georges Bank². On the contrary, fishermen from Maine and New Hampshire fish today, as in the past, on Georges Bank, including on the northeastern portion. The statements in the Canadian Memorial indicate that Canada must be misinformed about the nature of the United States fishery on Georges Bank.

83. In his historical work, *The Fisheries and Fishery Industries of the United States*, George Brown Goode records the fact that United States fishing vessels from Maine routinely engaged in the Georges Bank fisheries in the 19th century. Goode reports that, as early as 1844, vessels from Maine fished on Georges Bank, including the northeastern portion:

“The first vessel from Southport to engage in the halibut fisheries was the schooner Pearl, Capt. O. Harris, in 1844. The Pearl . . . went in the fall and fished with handlines from the vessel’s deck, catching their fish usually in from 30 to 90 fathoms *on the northeast edge of Georges Bank* . . .”³.

84. Goode confirms that vessels from the ports of Southport and Vinal Haven, Maine, were regular participants in the cod fishery on Georges Bank⁴. In addition, the New England haddock fishery in the 19th

¹ See Part III, Chapter III, Section 7.

² The following are examples from the Canadian Memorial: para. 29: “The fishermen of Maine . . . do virtually no fishing on Georges Bank”; para. 32: “Virtually all United States fishing on Georges Bank is conducted from communities on the coasts of Massachusetts and Rhode Island from Gloucester to Newport”; para. 35: “The coasts of New Brunswick and Maine face the inner part of the Gulf of Maine. The relative distance of these coasts from Georges Bank is reflected in the absence of any significant economic link to the fisheries of the Bank”; para. 59: “Neither Maine nor New Brunswick are significant centres for the Georges Bank fishery”; para. 61: “Southwestern Maine and New Hampshire do not make any substantial use of Georges Bank;” para. 120: “. . . the coastal States of . . . New Hampshire and Maine . . . are not significant participants in the fishery of Georges Bank”; para. 176: In Maine . . . (t)here has been little reliance on Georges Bank . . .”. As shown in Part II, such considerations, whatever their veracity, are not legally relevant to the delimitation of a single maritime boundary.

³ Goode, *op. cit.*, Section V, p. 38. [Emphasis added.] Annex 23, Vol. V.

⁴ See United States Memorial, Annex 18, Vol. II, p. 188.

TABLE B

**CATCHES ON GEORGES BANK¹ AND THE NORTHEASTERN
PORTION² OF THE BANK OF VESSELS FROM
PRINCIPAL NEW ENGLAND PORTS, 1936--1968 (pounds)**

YEAR	Georges Bank Total	Northeastern Portion Of Georges Bank	% of United States Georges Bank Catch From the Northeastern Portion of the Bank
1936	171,913,871	93,404,175	54%
1937	171,660,079	105,804,916	62%
1938	167,759,923	86,969,020	52%
1939	154,305,404	75,719,002	49%
1940	155,236,307	69,649,834	45%
1941	185,770,563	94,328,079	51%
1942	141,986,810	80,127,319	57%
1943	29,863,748	3,969,947	14%
1944	41,883,296	10,015,793	24%
1945	88,739,335	27,265,798	31%
1946	182,889,982	65,592,211	36%
1947	211,021,939	80,380,865	39%
1948	193,453,101	77,576,366	40%
1949	185,583,352	82,512,072	44%
1950	158,334,031	60,511,897	38%
1951	184,322,422	71,625,061	39%
1952	154,792,699	69,927,661	45%
1953	152,476,537	71,618,983	47%
1954	192,957,215	65,736,795	34%
1955	212,610,153	67,231,836	32%
1956	232,897,151	66,093,062	29%
1957	244,296,162	73,071,153	30%
1958	199,624,260	61,869,484	31%
1959	212,652,542	61,707,207	30%
1960	221,576,244	69,321,664	31%
1961	223,122,710	77,862,318	35%
1962	248,293,336	90,654,951	37%
1963	237,671,791	76,904,041	32%
1964	233,196,154	83,679,831	36%
1965	249,526,914	68,266,775	27%
1966	247,475,909	56,387,478	23%
1967	190,956,668	45,852,487	24%
1968	169,188,110	46,915,431	28%

Source: *Fishery Industries of the United States*, United States Department of Commerce, 1937--1938; *Fishery Statistics of the United States*, Department of The Interior, 1939--1969.

⑫

1. Georges Bank is defined by the six statistical units depicted at Figure 23 of the Canadian Memorial. The fishing grounds comprising these statistical units are referred to in the *Fishery Industries of the United States* and the *Fishery Statistics of the United States* as: Western Side South Channel, Eastern Side South Channel, Northern Edge of Georges, Northeast Peak of Georges, Central Georges, Southeast Georges, Southwest Georges, Lightship Grounds, Nantucket Shoals.

⑫

2. The Northeastern Portion of Georges Bank refers to Statistical Units 52e and 52em (523, 524) as depicted at Figure 23 of the Canadian Memorial. The fishing grounds comprising these statistical units are referred to in the *Fishery Industries of the United States* and the *Fishery Statistics of the United States* as: Northern Edge of Georges, Northeast Peak of Georges, Central Georges and Southeast Georges.

century was pursued by many vessels from Maine, with the larger ones from Portland and Southport visiting Georges Bank.

85. Raymond McFarland, in *A History of New England Fisheries*, writes that, in the 1880s, up to one-fourth of the United States vessels in the Georges Bank mackerel fishery were from Maine¹. He notes that Maine's interest extended beyond Georges Bank to Browns Bank, Sable Island Bank, and other fisheries off the coast of Canada².

86. In the early part of the 20th century, fishermen from Maine participated in the establishment of new United States fisheries on Georges Bank³. In particular, vessels from Maine, along with the New Bedford fleet, established the United States scallop fishery on Georges Bank in the 1930s⁴.

87. During the buildup of the distant water fleets on Georges Bank in the 1960s, the Maine offshore fleet fished primarily the waters of the Scotian Shelf and the deeper waters of the Gulf of Maine Basin, including the "unclaimed area"⁵. This fishing pattern has changed dramatically with the extension of fisheries jurisdiction to 200 nautical miles in 1977 and the unilateral expulsion in 1978 of United States fishermen from waters off the coast of Canada. Once the large distant-water fleets left Georges Bank, smaller Maine vessels resumed their traditional fisheries on the Bank. In addition, the Maine offshore fleet, which was affected directly by the unilateral expulsion of United States fishermen from waters off Canada in 1978, has altered its traditional pattern and now fishes regularly on Georges Bank.

88. In 1982, approximately 98 vessels from Maine or New Hampshire fished on Georges Bank or in the so-called "unclaimed area" in the Gulf of Maine Basin⁶. The fleet from Maine currently fishing on Georges Bank consists of four categories of vessels: large vessels that formerly fished for

¹ R. McFarland, *A History of the New England Fisheries*, 1911, pp. 272-273. Annex 24, Vol. V.

² *Ibid.*, p. 145.

³ During the same period, Maine fishermen developed new fisheries off Canada. In the 1920s in particular, the Maine redfish fleet developed and supported a processing industry that supplied redfish to midwestern consumers under the name "Ocean Perch". That fleet prospered until, together with other United States fishing vessels, it was expelled from its traditional fishing grounds off Canada.

⁴ Ackerman, *op. cit.*, p. 58. Annex 7, Vol. IV.

⁵ The so-called "unclaimed area" is described at United States Memorial, para. 151 and Figure 17.

⁶ See Annex 25, Vol. V for a list of vessels from Maine and New Hampshire that fished on Georges Bank or in the so-called "unclaimed area" in 1982.

redfish off Canada, prior to Canada's unilateral expulsion of those vessels in 1978, but that have since redirected their efforts to groundfish on Georges Bank; large purse seine/trawler vessels that fish for groundfish on Georges Bank when the inshore herring fishery is closed or unprofitable; the medium-sized otter trawl fleet that grew quickly in Maine after third-State fleets were regulated under the 200-nautical-mile fisheries jurisdiction; and, a small-boat fleet that fishes on Georges Bank when the weather and other factors are favorable.

89. A description of the adjustment that has been made in the Maine redfish industry since it was expelled in 1978 from Canada's 200-nautical-mile fishing zone is instructive. When Canada unilaterally expelled these fishermen in 1978 from the waters off its coast, the United States redfish fleet was forced to fish the limited Gulf of Maine stock. As is to be expected, redfish landings dropped, and adjustments had to be made. In some cases, this meant the redirection of employment in the processing and harvesting sectors of the industry. In other cases, this required conversion of boats and other equipment for use in the groundfish industry and in the cod, haddock, and flounder fisheries on eastern Georges Bank¹.

90. The shift by Maine fishermen from redfish off Canada's coast to groundfish from Georges Bank, including the northeastern portion of the Bank, not only is proof that fishermen from Maine do fish on Georges Bank, it is also evidence that these same fishermen already have been forced to make significant adjustments in traditional fishing patterns because of their expulsion from Canadian waters following Canada's extension of its fisheries jurisdiction to 200 nautical miles.

SECTION 5. The History of the International Convention for the Northwest Atlantic Fisheries Illustrates that the United States Has the Predominant Interest in Georges Bank, While Canada's Interest Centers on the Major Fishing Banks to the North off Canada

91. Canada alleges that the United States and Canada have been "coastal State partners" in relation to the fisheries of Georges Bank². In support of this position, Canada cites its membership, within the International Convention for the Northwest Atlantic Fisheries (ICNAF), on the international Panel (Panel 5) established for management responsibilities relating to Subarea 5 (off New England).

¹ This conversion of the United States redfish fleet to groundfishing on Georges Bank continues. See D. R. Getchell, Sr., "No Compromising", in *Fishing Gazette*, Vol. 100, No. 5, May 1983, p. 25. Annex 42, Vol. V.

² Canadian Memorial, paras. 197-199. Canada's legal argument is misguided, irrespective of whether the facts support its assertions. By stressing the notion of "partnership", Canada seeks to persuade the Court that its function should be to "share-out" the resources of the area. This view of the Court's function in the delimitation of maritime boundaries has been rejected in past maritime boundary cases, and is not within the Court's purview in this case. See Part II, Chapter I.

92. Canada neglects to mention that, to whatever extent that Canada was considered a "coastal State" for Subarea 5, the United States was equally considered a coastal State for Subarea 4, off Nova Scotia. In fact, the ICNAF coastal-State concept was used only in a regional sense, to distinguish North American from distant-water fleets.

93. Similarly, the alleged "partnership" between the United States and Canada, to the extent any existed at all, concerned the operation of the Convention as a whole, and not its specific Panels. The United States and Canada often cooperated within ICNAF to protect their fishermen from distant-water fleets, albeit, at the same time, they were also competing with each other. The United States and Canada concentrated their efforts, however, on the fisheries off their respective coasts. In Subarea 5 (off New England), the United States provided the leadership, conducted most of the research and most of the enforcement, proposed most of the management measures, and received the preponderance of allocations based upon coastal-State preference. Canada, on the contrary, assumed the leadership role with respect to the northern areas. Nearly all of Canada's fishery research, enforcement activities, regulatory proposals, and fishery allocations were related to Subareas 3 (off Newfoundland) and 4 (off Nova Scotia).

94. Each State also was involved, to a lesser extent, in the fisheries outside its area of primary interest. Thus, the United States was an original member of Panel 4, and Canada of Panel 5. The United States fished in Subareas 3 and 4, and Canada fished in Subarea 5. Canada was no more a "partner" with the United States in Subarea 5, however, than was the United States a "partner" with Canada in Subarea 4.

95. In brief, the alleged "coastal State partnership" between the Parties, to the extent any existed, concerned the entire region, and not merely the Georges Bank-New England area. Thus, the activities of the Parties under ICNAF no more entitle Canada to a share of Georges Bank than do they entitle the United States to a share of the rich fishing banks on the Scotian Shelf.

96. Annex 3 examines in detail the activities of the United States and Canada under ICNAF. This history illustrates the predominant interest of the United States in Georges Bank. Indeed, it was the concern for its important Georges Bank fishery that prompted the United States: to propose the establishment of ICNAF; to call for and to host the diplomatic conference that produced the Convention; to propose and to press for the adoption of nearly every major ICNAF innovation or amendment; and to assume the leadership role for Subarea 5, the New England-Georges Bank area. The history of ICNAF also illustrates that Canada's activities on Georges Bank are insignificant in relation to Canada's interest in the vast fisheries off Canada to the northeast, on the banks of the Scotian Shelf, in the Gulf of St. Lawrence, and on the Grand Banks of Newfoundland.

CHAPTER V

CONTINENTAL SHELF ACTIVITIES OF THE PARTIES AND THEIR NATIONALS

SECTION 1. Points of Agreement and Disagreement Between the United States and Canadian Memorials

97. There is a large measure of agreement between the Parties regarding Canadian activities on the continental shelf. The Canadian Memorial confirms that, although Canada issued exploration permits on the northeastern portion of Georges Bank¹, the permittees subsequently were exempted from normally imposed work requirements². The Canadian Memorial fails to specify whether any substantial geophysical exploration activity occurred pursuant to those permits before the permittees were exempted from the work requirements, or whether any permit has been converted into a lease with oil and gas production rights. Canada does confirm, however, that no drilling has occurred on Georges Bank under the dormant Canadian exploration permits³.

98. The Parties disagree concerning United States activities on the continental shelf. Canada disregards the longstanding United States interest in the development of the continental shelf, which dates at least from the Truman Proclamation of 1945³. Canada's assertion that "[n]o United States exploration or production permits have ever been issued

¹ Canadian Memorial, paras. 204-205. The evidence adduced by Canada does not contradict the United States view that "[t]he statute pursuant to which the Canadian exploratory permits were issued applied on its face only to onshore development". United States Memorial, para. 101. *See* para. 108, n. 3 of this Part.

² Canadian Memorial, para. 222.

³ United States Memorial, para. 89. Canada also disregards the interests of the *New England states in the continental shelf, which date back at least to 1969*, when the state of Maine offered oil and gas leases for areas of the continental shelf in the Gulf of Maine. Subsequent litigation between Maine and other Atlantic coast states and the federal government confirmed the rights of the federal government in the oil and gas resources of the continental shelf. United States Memorial, para. 94, n. 1. Nonetheless, the states continue to assert their interests regarding activities on the continental shelf, particularly with regard to possible environmental effects of oil and gas development on Georges Bank.

with respect to the disputed portion of the Gulf of Maine area¹ is inaccurate.

SECTION 2. The United States Has Issued Exploration Permits for the Northeastern Portion of Georges Bank Pursuant to Which Extensive Geophysical Exploration Has Taken Place

99. The United States authorizes exploration of the continental shelf through the issuance of "permits", which are different from "leases". An exploration permit, which may be obtained upon application, provides the holder with a non-exclusive authorization to conduct seismic exploration and other geophysical activities that do not significantly disturb the seabed. A United States lease, by contrast, grants exclusive oil and gas production rights in addition to the right to conduct deep exploratory drilling². Such leases are only awarded pursuant to a formal process of competitive bidding, and they are subject to stringent environmental safeguards³.

100. As described in the United States Memorial, beginning in the 1950s, the United States enacted a series of laws and regulations that balanced the need to develop the continental shelf with the thorough study and protection of the environment⁴. In 1960, a program to explore the continental shelf off the east coast of the United States was begun, and permits for exploration of the continental shelf off New England were issued beginning in 1964⁵.

101. The first United States exploration permit pertaining to Georges Bank was issued in 1965⁶. Many other such permits have followed. In

¹ See Canadian Memorial, para. 219. In a curious turn, the Canadian Memorial follows its assertion that no United States permits ever have been issued for the northeastern portion of Georges Bank with an acknowledgment that seismic surveys by private United States companies have been carried out in that very area. Indeed, Canada has been aware for some time that United States exploration permits covering all of Georges Bank have been issued. Note No. 1126 from the Dept. of External Affairs to the Embassy of the United States, dated 19 Sept. 1974, and Note from the Embassy of the United States to Dept. of External Affairs, dated 11 Oct. 1974, United States Memorial, at Annex 60, Vol. IV, record an exchange of diplomatic correspondence on this subject.

² United States Memorial, para. 90, n. 5.

³ United States Memorial, paras. 94-98.

⁴ United States Memorial, para. 92.

⁵ United States Memorial, para. 93.

⁶ List of Permits accompanying letter of 20 January 1983 from Davis R. Robinson, Agent of the United States, to Mr. Santiago Torres Bernárdez, Registrar, International Court of Justice. Annex 15, Vol. V.

fact, as documented in Annex 40 to the United States Memorial and as updated in Annex 26 to this Counter-Memorial, over 20,000 nautical miles of seismic survey lines have been collected on the northeastern portion of Georges Bank alone¹. The area of coverage of the seismic data collected on the northeastern portion of Georges Bank and on nearby areas is depicted at Figure 13.

102. Thus, contrary to Canada's assertions, the United States has conducted extensive exploration activities on Georges Bank, including its northeastern portion. The United States also has analyzed extensively the implications of hydrocarbon development on the marine environment. Furthermore, on the basis of the Canadian activities that Canada has described in its Memorial, the continental shelf activities of the United States far exceed those of Canada in the area.

¹ Annex 26, Vol. V.

CHAPTER VI

* OTHER RELEVANT ACTIVITIES

103. The United States Memorial addresses activities, other than those related to fisheries and to the continental shelf, that the United States believes are relevant to this case ¹.

104. With the sole exception of a brief reference to scientific research activities conducted under ICNAF ², the Canadian Memorial failed to address these other relevant activities. The United States believes that such activities as charting and surveying, providing other aids to navigation, conducting search and rescue operations, ensuring national defense interests, and scientific research efforts are relevant to this case. These activities confirm the predominant interest of the United States on Georges Bank and in the Gulf of Maine Basin.

(102) - (106)

105. Figures 14 through 18 are reproductions of charts contained in Part I, Chapter III, of the United States Memorial, that depict divisions of responsibilities with respect to fishery and other relevant activities in the Gulf of Maine area, together with the boundary proposed by the United States and the Canadian line ³.

106. The United States does not argue that these activities vest in the United States those rights associated with an historic title. Nor does the United States argue that Canada, by virtue of its acceptance of the lines depicted, has recognized exclusive United States jurisdiction over Georges Bank. The United States does believe, however, that the agreements between the Parties in these matters reflect their mutual understanding of their respective responsibilities in the area, and that they establish a pattern of conduct that is inconsistent with a Canadian claim to jurisdiction over any part of Georges Bank. Furthermore, these agreements confirm the suitability of the Northeast Channel as a limit between the United States and Canada in the Gulf of Maine area.

¹ United States Memorial, paras. 102-132.

² Canadian Memorial, paras. 195-196.

(147) (148)

³ Annex 27, Vol. V, contains Figures 11 and 16 of the United States Memorial, together with the boundary proposed by the United States and the Canadian line.

CHAPTER VII

HISTORY OF THE DISPUTE

107. The major disagreement between the Parties regarding the history of the dispute relates to the Canadian exploration permit program on Georges Bank in the mid-1960s¹.

108. Canada issued exploration permits covering a portion of Georges Bank in the face of longstanding policies of the United States relevant to this area, including the Truman Proclamation of 1945². The issuance of the Canadian exploration permits on Georges Bank, beginning in 1964, was undertaken without notice to, or consultation with, United States officials. The Canadian program lacked notoriety. Insofar as the United States is aware, the permits were issued by Canada pursuant to laws and regulations that were not specifically applicable to offshore areas³.

¹ The Parties also differ sharply in their characterization of, and the legal significance they attach to, the fishery negotiations of 1977-79. These negotiations resulted in the rejected and unratified 1979 east coast fisheries agreement. The issues raised by these differences are discussed in Part III, Chapter III, Section 5, of this Counter-Memorial, which deals with Canada's misapplications of the law to the facts.

² Canada issued these permits notwithstanding the fact that the United States had initiated the first stage of offshore hydrocarbon development with the passage of the United States Outer Continental Shelf Lands Act in 1953. United States Memorial, Annex 9, Vol. I. The United States also had opened the continental shelf on the east coast to exploration by permit in 1960 by means of a public notice in the United States *Federal Register*. See generally United States Memorial, paras. 89-99, and Annexes 8-10, Vol. I.

³ United States Memorial, para. 101 and Annex 11, Vol. I. The statute and regulations cited at para. 101 are not on their face applicable to the continental shelf. As one Canadian commentator stated in 1980:

"[T]here is no law of Parliament vesting in the Crown in right of Canada property in and exclusive jurisdiction over the territorial sea and over the resources of the continental shelf beyond and adjacent to the territorial sea or, of equal importance, setting out the laws that are to apply to human activities taking place aboard installations or platforms engaged in exploring or exploiting the resources of the submarine areas beyond the limits of the internal waters of Canada."

(footnote continued on next page)

109. Nearly a year passed before mid-level United States Government employees from a department not charged with the conduct of foreign relations independently became aware of the Canadian program, and, on their own initiative, wrote to their counterparts in the corresponding government agency in Canada, seeking information about Canada's actions. It is upon this non-diplomatic, administrative inquiry that Canada seeks in its Memorial to construct arguments relating to acquiescence and estoppel¹.

110. In a letter of 1 April 1965, Mr. Max Caplan, on behalf of Mr. L. T. Hoffman, Assistant Director, Lands and Minerals, Bureau of Land Management, United States Department of the Interior, requested the Canadian Department of Northern Affairs and National Resources to supply information concerning Canadian permits that had come to their

(footnote continued from the previous page)

.....
 "[T]here is no single Act of Parliament which clearly establishes Canada's sovereign and property rights to the territorial sea or its sovereign rights over the resources of the continental shelf. Nor, of equal importance, is there an existing law of Parliament that establishes what laws are to be made applicable in ordering private relations among persons undertaking offshore resource-related activities, such as exploration or drilling for oil and gas. Nor is there any Act of parliament that sets out the courts of Canada that are to have jurisdiction to entertain actions arising out of these activities."

.....
 "...[O]il and gas exploration and production in the Canadian offshore are regulated by the Canada Oil and Gas Land Regulations and Oil and Gas Drilling Production Regulations, both made under the Public Lands Grants Act and the Territorial Lands Act. *These regulations, originally intended for application only on land territory, as a matter of administrative procedure have come to be applied to the Canadian offshore, though nothing either in the Regulations themselves or in the Acts under which they were made seems to provide legal authority for such application.*"

L. L. Herman, "The Need for a Canadian Submerged Lands Act: Some Further Thoughts on Canada's Offshore Mineral Rights Problems", *The Canadian Bar Review*, Vol. LVIII, 1980, pp. 518, 521-2, 526-7. [Emphasis added.] Annex 43, Vol. V.

¹ Canada asserts that, by its conduct, the United States has consented and cannot now be heard to object to the use of the equidistance method to delimit the single maritime boundary in the Gulf of Maine area. Canada's description of the conduct of the Parties is inaccurate and incomplete. Canada's description of the law relating to acquiescence and estoppel is also incomplete. See Part II, Chapter IV.

attention¹. The letter makes clear that Mr. Caplan and Mr. Hoffman were misinformed about any treaty relationship in 1965 between the United States and Canada under the 1958 Geneva Convention on the Continental Shelf, since Canada did not ratify that Convention until 1970 (and only then subject to a "declaration")². The letter also makes clear that these employees did not possess copies of whatever regulations and instructions might have been the basis of the Canadian program.

111. A few weeks later, after a Canadian response on 8 April 1965³, Mr. Hoffman again wrote to the Canadian Department of Northern Affairs and National Resources, as follows:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

May 14, 1965

Mr. D. G. Crosby
Department of Northern Affairs
and National Resources
Northern Administrative Branch
Kent Building, 150 Kent Street
Ottawa, Canada

Dear Mr. Crosby:

Thank you for the maps showing locations and holders of the offshore oil and gas permits you have issued on the east and west coasts. We also appreciate the copy of your printed oil and gas land regulations.

As a matter of some concern to us, *we believe that you have issued offshore permits on the Outer Continental Shelf pertaining to the United States. We believe this is the case in the Gulf of Maine*, off the Straits of Juan de Fuca, and Dixon Entrance. We are unable to comment on the permits you have issued in the Arctic Ocean as we do not have a map showing their locations.

Inasmuch as the location of a median line might be subject to different interpretations, we suggest that you check the locations of your permits which approach submerged lands under United

¹ The letter is referred to at para. 206, and reprinted at Annexes, Vol. III, Annex 1, of the Canadian Memorial, and at para. 136 and Annex 53, Vol. IV, of the United States Memorial.

² See Canadian Memorial, para. 217.

³ United States Memorial, para. 136 and Annex 53, Vol. IV; Canadian Memorial, para. 207 and Annexes, Vol. III, Annex 2.

States jurisdiction to see if they are within Canadian jurisdiction under an application of Article 6 of the Convention on the Continental Shelf of the 1958 Geneva Conference.

This communication is being written solely in the interest of seeing if there is a basis for disagreement as to the location of a median line separating our respective jurisdictions on the Outer Continental Shelf. *As an operating Bureau, we, of course, have no authority to enter into any formal discussion* of the location of a median line in case of a dispute. However, we are hopeful that there could be a simple misunderstanding on either our part or yours, of the elements positioning a median line. If this is the case, then the matter could be amicably determined without resort to high authority.

In the last paragraph of your letter of April 8 you ask for the location of leases we might have issued off the east coast and the State of Washington. No Federal oil and gas leases on the Outer Continental Shelf off the east coast have been issued. However, *certain seismic permits have been issued*. These permits allow only geophysical activities and no deep drilling. Although a number of blocks off Washington were leased as a result of our October 1, 1964 sale, we believe you will be interested in only Blocks 21 N., and 61 and 62 W. that are nearest to the Canadian-United States boundary.

Sincerely yours,

/S/ L.T.HOFFMAN

Assistant Director ¹

112. Thus, in correspondence that he initiated, Mr. Hoffman made clear within a few weeks that, in his view, Canada had issued permits on the *United States* continental shelf; that he believed that Canada had applied Article 6 of the Continental Shelf Convention incorrectly (when in fact Mr. Hoffman was unaware that the Convention did not apply at all at that time); that neither he nor his agency had authority to enter into boundary discussions; and, that United States exploration permits had been issued for this area. Mr. Hoffman's letters, therefore, take clear

¹ United States Memorial, para. 136 and Annex 53, Vol. IV; Canadian Memorial, para. 208 and Annexes, Vol. III, Annex 4. [Emphasis added.]

exception to the Canadian permit program. Furthermore, the United States and Canada do not set forth fundamental national positions of diplomatic character in routine correspondence between government employees of this level ¹.

113. Following this correspondence initiated by Mr. Hoffman in 1965 ², a year passed before the Canadian permit program on Georges Bank became the subject of a 16 August 1966 letter from the United States Embassy to the Canadian Department of Mines and Technical Surveys ³. This letter was in turn answered on 30 August 1966 by an official of the Canadian Department of External Affairs, the text of which response follows:

DEPARTMENT OF EXTERNAL AFFAIRS
MINISTÈRE DES AFFAIRES ÉXTERIEURES
CANADA

Ottawa, August 30, 1966

Dear Mr. Olson:

I wish to refer to your letter of August 16 which you addressed to Mr. J. W. McNeil, Director, Research Development Branch, Department of Mines and Technical Surveys, concerning Canadian exploratory permits in that part of the Continental Shelf which is situated off the Eastern Coast of Canada. In view of this Department's general interest in the exploration activities being carried out on the Canadian Continental Shelf in close proximity to areas under the jurisdiction of foreign countries, *it was deemed preferable that this Department should answer your query*. In order to avoid unnecessarily long delays, we would very much appreciate your directing any future enquiries of a similar nature to the Legal Division of this Department.

As we have commented previously in a letter to the United States Department of the Interior, the policy of the Canadian Government has been to issue permits covering grid areas up to and straddling the medium line which divides the areas of

¹ In the conduct of relations between the United States and Canada, Canada is generally insistent upon the practice whereby diplomatic positions are to be set forth in correspondence between the departments responsible for the conduct of foreign relations.

² Employees of the Dept. of Northern Affairs and National Resources replied to Mr. Hoffman's 14 May 1965 letter on 28 May 1965 and on 16 June 1965. United States Memorial, Annex 53, Vol. IV; Canadian Memorial, para. 208 and Annexes, Vol. III, Annexes 5 and 6.

³ United States Memorial, para. 137 and Annex 54, Vol. IV; Canadian Memorial, para. 210 and Annexes, Vol. III, Annex 7.

jurisdiction between Canada and the United States since the exact position of that line might be open to some interpretation. However, when such is the case a cautionary statement is included in the permit to the effect that it is issued subject to the lands covered thereby being Canada Lands. The attached map and index will provide you with all available information concerning permits which have been issued under the Oil and Gas Land Regulations off the Southeast Coast of Canada.

As to your request for information on operational plans and schedules of oil companies holding permits in the above mentioned area, our policy has been to regard the question of the publicity to be given to such plans as the permit holders may have as the exclusive responsibility of the companies concerned. The competitive nature of their business is of such scope that only they can reasonably establish the criteria for their publicity requirements. The Canadian Government is, of course, made aware of these plans but only insofar as it is necessary to exercise proper jurisdictional control over such operations in accordance with existing legislation. While we cannot, therefore, make such information public, the fact is that a considerable amount of information has over the years been released through the press and we call your attention in particular to the trade magazine "Oilweek".

Please do not hesitate to call upon us if we can be of further assistance.

Yours sincerely,

(for)

Under-Secretary of State
for External Affairs

Robert K. Olson, Esq.,
Second Secretary,
United States Embassy,
100 Wellington Street,
Ottawa, Ontario¹

¹ United States Memorial, para. 137 and Annex 54, Vol. IV; Canadian Memorial, para. 210 and Annexes, Vol. III, Annex 8. [Emphasis added.]

114. Thus, it was only in August of 1966 that Canada first made its permit program the subject of diplomatic correspondence. This letter, which appeared only after Mr. Hoffman had expressed his reservations, did not answer United States inquiries regarding the operational plans and schedules of Canadian permit holders, but instead cited the confidential proprietary nature of pertinent information, and referred the United States Embassy to trade publications. As noted in the United States Memorial, "[t]he United States Government received no information indicating that any activity by Canadian permittees was imminent".

115. Soon after this correspondence, the first seismic survey data relating to the northeastern portion of Georges Bank, under United States permits, were collected². On 10 May 1968, less than 21 months after the matter had entered diplomatic channels, the United States formally suggested:

"... a temporary suspension of exploration and exploitation activities with regard to mineral resources in the area of the northern half of the Georges Banks [sic] to permit consultation to take place and to provide time to seek agreement on the exact location of the boundary in this area".

In the face of Canada's refusal to agree to a moratorium on continental shelf activities on Georges Bank, the United States continued to authorize seismic exploration in that area, although no exploratory drilling was authorized. On 5 November 1969, in view of the lack of progress in resolving the dispute, the United States protested the Canadian position⁴.

116. During this period, the United States reviewed its position, and, on 21 February 1970, issued a public notice that described the nature of the dispute, and that noted that United States restraint in not authorizing exploratory drilling did not constitute acquiescence in or recognition of the Canadian permits⁵. This position, which was in full conformity with the Truman Proclamation of 1945, was well known to Canada at the time it became a Party to the 1958 Geneva Convention on the Continental Shelf on 8 March 1970⁶. Canada did not define a boundary position

¹ United States Memorial, para. 137.

² The first such permit, No. E3-67, is included in the list at Annex 26, Vol. V.

³ United States Memorial, para. 138 and Annex 55, Vol. IV; Canadian Memorial, para. 211 and Annexes, Vol. III, Annex 11.

⁴ United States Memorial, paras. 139-140 and Annex 56, Vol. IV; Canadian Memorial, para. 215 and Annexes, Vol. III, Annex 13.

⁵ United States Memorial, para. 141 and Annex 57, Vol. IV.

⁶ United States Memorial, para. 142 and Annex 52, Vol. IV; Canadian Memorial, para. 217.

specified by geographic coordinates until 1 November 1976¹. On 25 January 1979, Canada abandoned the boundary position that it now claims the United States accepted, based upon the non-diplomatic correspondence of the mid-1960s described above².

117. Canada chose to make its ultimate claim, despite the fact that it long had known that Georges Bank was an area within the 100-fathom-depth contour off the United States coast, referred to in connection with the Truman Proclamation of 1945. Canada was well aware in the mid-1960s that Georges Bank was an area within which the United States maintained the predominant interest in the fisheries. In the view of the United States, the relationship between the resources of the continental shelf and fisheries of the area is confirmed by Figure 19, which reproduces the map officially communicated in 1948 to the Canadian Government by the United States in connection with preparations for the (107) ICNAF treaty negotiations³. This map shows the Northeast Channel beyond the 100-fathom-depth contour as the dividing line between New England (Statistical Area XXII) and Nova Scotia (Statistical Area XXI).

118. The Canadian permit program on Georges Bank never proceeded beyond its initially little-known first stage. As far as the United States can determine, no permittee conducted any exploration activities on Georges Bank pursuant to these Canadian "permits". Furthermore, no Canadian permittee ever has conducted exploratory drilling on Georges Bank⁴. Indeed, in an apparent response to United States objections, Canada suspended normally imposed work requirements by 1971⁴. Moreover, as far as can be determined, no Canadian permit on Georges Bank ever has been converted into an oil and gas production lease.

¹ Canada did not refer to the continental shelf in its notification of proposed limits for the Canadian 200-nautical-mile fishing zone. 101 *The Canada Gazette* (EXTRA), Vol. 110, 1 Nov. 1976. United States Memorial, para. 150 and Annex 63, Vol. IV. Insofar as the United States is aware, the first public indication of the geographic coordinates of the continental shelf over which Canada claimed jurisdiction occurred on 15 September 1978, when Canada gave public notice of the proposed expansion of its fisheries jurisdiction in the Gulf of Maine area. In that notice, Canada made those coordinates applicable to the continental shelf. 112 *The Canada Gazette*, No. 79 (EXTRA), 15 Sept. 1978, United States Memorial, Annex 73, Vol. IV, at p. 3; Canadian Memorial, para. 245.

² Canadian Memorial, para. 245 and Annexes, Vol. II, Annex 42.

³ See Annex 3, Vol. II, Activities of the United States and Canada Under the International Convention for the Northwest Atlantic Fisheries (ICNAF).

⁴ Canadian Memorial, para. 222.

119. The inchoate nature of the Canadian permit program is illustrated by an examination of Annex 49, Volume II, of the Canadian Memorial. This examination reveals that the Canadian permits on Georges Bank have yielded the Government of Canada Can.\$26,000.00 in fees and apparently have been assessed Can.\$404,099.90 in deposits¹. These sums are to be compared to the U.S.\$816,500,000.00 that United States companies have paid for oil and gas leases on Georges Bank issued by the United States Government².

120. In Part III, Chapter I, of this Counter-Memorial, the United States shows that, as a matter of law, the facts surrounding the Canadian permit program of the mid-1960s do not support the acquiescence and estoppel arguments proffered by Canada.

¹ Guaranty deposits normally imposed upon permit holders are refunded as exploratory work is performed and expenditures documented. It is unclear to the United States whether the deposits specified in those permits were retained since the suspension of work requirements in 1971.

² Canadian Memorial, para. 88 and Annexes, Vol. II, Annex 45. Under the United States policy of restraint, those United States leases were restricted to the undisputed portions of Georges Bank.

PART II. THE LAW

INTRODUCTION

121. In this Part, as required by Article 49(2) of the Rules of Court, the United States responds to the statement of the law contained in the Canadian Memorial¹.

122. The United States and Canada agree that this is the first case before an international tribunal to address the delimitation of a single maritime boundary between neighboring States beyond the territorial sea. Both States recognize, however, that there is a large body of existing law relating to the delimitation of exclusive fishing zones, of the continental shelf, and of other boundaries, all of which serves to delineate the principles of law governing this delimitation². As Canada notes in its Memorial:

“There is in this respect a continuum of law that links the shelf and the water column, the traditional law of the sea and its contemporary development, and the conventional and customary law of maritime delimitation³.”

123. Canada and the United States agree on the fundamental rule of law governing the delimitation of a single maritime boundary. As Canada asserts in its Memorial:

“... there is an underlying and fundamental norm or rule of law to be applied to all maritime delimitations and therefore to the single maritime boundary in the Gulf of Maine area. This single rule of law is that *maritime boundaries are to be determined in*

¹ See Canadian Memorial, paras. 277-427.

² As noted above, the United States and Canada are Parties to the 1958 Geneva Convention on the Continental Shelf. The United States ratified the Convention in 1961. United States Memorial, Annex 5, Vol. I. Canada ratified the Convention in 1970 with a “declaration”, to which the United States took exception. United States Memorial, Annex 52, Vol. IV. Although both States agree that Article 6 of the Convention is relevant as a source of the principles and rules that would be involved in a case solely delimiting the continental shelf, they also agree that Article 6 of the Convention is not determinative of the delimitation of a single maritime boundary. United States Memorial, para. 165; Canadian Memorial, paras. 280, 283, and 360. As Canada aptly has stated, the nature of the dispute between the Parties was “expanded and transformed” by the creation of 200-nautical-mile fishing zones by the Parties and by the emergence of the concept of the exclusive economic zone. Canadian Memorial, para. 223.

³ Canadian Memorial, para. 285.

accordance with equitable principles, taking account of all the relevant circumstances, in order to achieve an equitable result"¹.

The United States hereinafter refers to this agreed formulation as "the Fundamental Rule governing delimitation of single maritime boundaries", or simply the "Fundamental Rule".

124. In its Memorial, the United States identified and applied four equitable principles applicable to the delimitation of a single maritime boundary. Canada agreed in its Memorial that maritime boundaries must be determined in accordance with equitable principles, but nonetheless asserted that such equitable principles can neither be identified nor applied in the abstract². Canada instead identified "factors", which it argues are legally relevant to delimitation.

125. One such "factor" identified by Canada is that of "coastal geography—the configuration of the coasts", which Canada asserts:

"... is a leading factor in the law of maritime delimitation, since the coast is both the basis for title and the point of departure from which one must set out in any delimitation"

Canada quotes approvingly a passage from the *Tunisia/Libya* case⁴ affirming the principle, applied by the International Court of Justice in the *North Sea Continental Shelf* cases⁵, that "the land dominates the sea"⁶. In this and similar assertions regarding the fundamental importance of the coast to maritime delimitations, Canada would appear to affirm, albeit under a different characterization, the equitable principle, identified and applied in the United States Memorial, that a single maritime boundary must respect the relationship between the coasts of the Parties and the maritime areas lying in front of those coasts⁷.

126. In its identification of "factors", Canada appears to affirm the subsidiary principles of nonencroachment, proportionality, and natural prolongation. Canada acknowledges the requirement that an equitable

¹ Canadian Memorial, para. 278. [Emphasis added.]

² Canadian Memorial, para. 300.

³ Canadian Memorial, para. 303.

⁴ *Continental Shelf (Tunisia/Libyan Arab Jamahiriya)*, I.C.J. Reports 1982, p. 18.

⁵ *North Sea Continental Shelf, Judgment*, I.C.J. Reports 1969, p. 3.

⁶ Canadian Memorial, para. 303.

⁷ United States Memorial, paras. 239-246 and 306-315.

delimitation must avoid encroaching upon areas lying directly in front of the coast of another State ¹. Canada also accepts the view that proportionality should be used to test the equitableness of a single maritime boundary ². Furthermore, Canada appears to recognize that delimitation must respect the natural prolongation of the land territory of the Parties, where applicable ³.

127. In addition, Canada agrees that a single maritime boundary must take account of the relevant circumstances in the area ⁴, thereby affirming another of the equitable principles identified and applied by the United States in its Memorial.

128. In its Memorial, Canada failed to consider, even as "factors", two other equitable principles identified and applied by the United States: first, that delimitation should facilitate resource conservation and management; and, second, that delimitation should minimize the potential for international disputes between the Parties ⁵.

129. With regard to the circumstances that are relevant to delimitation, the Memorials of the United States and Canada agree upon a number of them, including: the configuration of the coasts of the Parties; special or unusual geographical features; the relationship of such coasts to one another; and, the conduct of the Parties ⁶.

130. Finally, the United States and Canadian Memorials agree, in principle, that the equidistance method is neither required by law nor accorded any preference in the delimitation of a single maritime boundary ⁷. As Canada states:

"The appropriateness of the equidistance method is always a function of the geographical and other relevant circumstances"

131. Although Canada and the United States appear to agree, in principle, upon much of the law governing the delimitation of a single maritime boundary, in fact, the Memorials of the Parties differ sharply concerning both the law and its application to the facts of this case.

¹ Canadian Memorial, paras. 339, 341 and 355.

² Canadian Memorial, para. 368.

³ Canadian Memorial, para. 289.

⁴ Canadian Memorial, para. 278.

⁵ See United States Memorial, paras. 247-256.

⁶ United States Memorial, paras. 259 and 261; Canadian Memorial, paras. 303, 305, and 320.

⁷ United States Memorial, para. 262; Canadian Memorial, para. 359.

⁸ Canadian Memorial, para. 357.

132. In effect, Canada argues that the function of this Court is an exercise in distributive justice, rather than an adjudication in accordance with international law. In this regard, Canada suggests that the Court is to apportion the relevant area and its resources without regard to the equitable principles identified previously by the International Court of Justice and by other international tribunals. The United States will show that Canada has misconstrued the function of this Court.

133. In addition, Canada makes the misguided argument that economic dependence and proximity are to be the determinative factors in delimiting a single maritime boundary, while also suggesting that relative wealth is such a factor. In so doing, Canada has overlooked the fact that previous adjudications by international tribunals delimiting continental shelf boundaries and exclusive-fishing zones, as well as the work of the Third United Nations Conference on the Law of the Sea and State practice, uniformly have rejected the relevance of economic dependence and relative wealth, as well as any preferred status for proximity.

134. Canada contends that the rejected and unratified 1979 east coast fisheries agreement should be invoked to the prejudice of the United States in this case. The United States will establish that Canada's attempted use of that failed agreement is contrary to fundamental principles of international law.

135. On the basis of its oil and gas permit program in the mid-1960s¹, Canada argues that the United States has acquiesced in the application of the equidistance method for delimiting the single maritime boundary in the Gulf of Maine area, and that the United States accordingly is estopped from objecting to that application in this case. The United States will show that Canada, in its Memorial, did not address all of the requirements of the doctrines of acquiescence and estoppel. The United States will also establish in Part III that, in view of the facts in this case, these doctrines do not apply, either to the Canadian line or to the method by which Canada proposes to delimit that line.

¹ See Part I, Chapter VII, *supra*.

CHAPTER I

THE FUNCTION OF THE COURT IS TO DELIMIT THE SINGLE MARITIME BOUNDARY IN THIS CASE IN ACCORDANCE WITH PRINCIPLES AND RULES OF LAW THROUGH THE APPLICATION OF EQUITABLE PRINCIPLES; IT IS NOT THE FUNCTION OF THE COURT TO MAKE AN EQUITABLE APPORTIONMENT OF THE AREA THROUGH AN EXERCISE IN DISTRIBUTIVE JUSTICE

136. The United States and Canada agree that the Fundamental Rule calls for maritime boundaries to be delimited according to equitable principles, taking account of the relevant circumstances in the area, to produce an equitable solution ¹.

137. Canada disregards the terms of the Fundamental Rule, however, and instead suggests that it requires the application of equity in the abstract sense to produce an equitable apportionment, or sharing out, of the resources in the area to be delimited ². Canada argues that this sharing out is to be determined, not in accordance with equitable principles, but on the basis of certain "factors". As Canada asserts:

"The search, accordingly, is not for equitable principles *per se*, but for those factors that are legally relevant to the goal of an equitable solution in the case at hand ³."

In its Memorial, Canada distinguishes between factors of general applicability and those factors that relate only to one aspect of the single maritime boundary, such as to the continental shelf or to the exclusive fishing zone ⁴. Canada does not, however, distinguish these factors, nor the role they are to play in the delimitation, from relevant circumstances.

138. In dispensing with the need to identify and to apply equitable principles, and by relying solely upon the balancing of "factors", particularly those of alleged economic dependence and relative wealth ⁵, Canada in effect is requesting the Court to enter a judgment *ex aequo et bono*, based upon a discretionary evaluation, without a clear basis in law. Such a judgment is impermissible under the terms of the Special Agreement

¹ United States Memorial, para. 237; Canadian Memorial, para. 285.

² Canadian Memorial, paras. 319 and 324.

³ Canadian Memorial, para. 300.

⁴ See Canadian Memorial, para. 301. To the extent that any of these Canadian "factors" should be considered as principles, they are addressed in this Part and in Part III.

⁵ Canadian Memorial, paras. 326, 375, 380, and 381.

between the Parties. That Agreement provides that the Chamber is to decide the course of the single maritime boundary "in accordance with the principles and rules of international law".

139. The law relating to delimitation of the continental shelf and of exclusive fishing zones, as well as recent developments in the Third United Nations Conference on the Law of the Sea, all require that delimitation be based upon a rule of law involving the application of equitable principles, and not upon a sharing out, as a matter of equity, of the resources of the area to be delimited.

SECTION 1. All Previous Continental Shelf Adjudications Have Rejected Equitable Apportionment, or Sharing Out, as a Basis for Delimitation

A. THE *North Sea Continental Shelf* CASES

140. The *North Sea Continental Shelf* cases² involved the delimitation of the continental shelves of the Netherlands, Denmark, and the Federal Republic of Germany in the North Sea. In that case, the International Court of Justice unequivocally rejected the notion that the Court's function in delimiting maritime boundaries is to apportion the area, or its resources, as a matter of equity. In presenting its case, the Federal Republic of Germany contended that delimitation of the continental shelf required an equitable sharing out, or apportionment, and that such an apportionment did not involve in any respect a request that the Court render a decision *ex aequo et bono*³. The Court rejected both contentions⁴. With regard to any sharing out, the Court stated:

"Delimitation is a process which involves establishing the boundaries of an area already, in principle, appertaining to the coastal State and not the determination *de novo* of such an area. Delimitation in an equitable manner is one thing, but not the same thing as awarding a just and equitable share of a previously undelimited area, even though in a number of cases the results may be comparable, or even identical⁴."

¹ Special Agreement Between the Government of the United States of America and the Government of Canada to Submit to a Chamber of the International Court of Justice the Delimitation of the Maritime Boundary in the Gulf of Maine Area, notified to the Court on 25 November 1981, at Art. II, para. 1. United States Memorial, Annex 2, Vol. I; Canadian Memorial, p. 3.

² *North Sea Continental Shelf*, I.C.J. Reports 1969, p. 3.

³ *Ibid.*, p. 21, para. 17.

⁴ *Ibid.*, pp. 21-22, para. 18.

141. The Court rejected the claim of the Federal Republic of Germany to a "just and equitable share" as fundamentally inconsistent with continental shelf doctrine:

"... the doctrine of the just and equitable share appears to be wholly at variance with what the Court entertains no doubt is the most fundamental of all the rules of law relating to the continental shelf, enshrined in Article 2 of the 1958 Geneva Convention, though quite independent of it,—namely that the rights of the coastal State in respect of the area of continental shelf that constitutes a natural prolongation of its land territory into and under the sea exist *ipso facto* and *ab initio*, by virtue of its sovereignty over the land, and as an extension of it in an exercise of sovereign rights for the purpose of exploring the seabed and exploiting its natural resources¹".

142. The Court held that equity plays a role in delimitation only as a legal concept, involving the application of equitable principles, as distinguished from equity in the sense of abstract justice:

"On a foundation of very general precepts of justice and good faith, actual rules of law are here involved which govern the delimitation of adjacent continental shelves—that is to say, rules binding upon States for all delimitations;—*in short, it is not a question of applying equity simply as a matter of abstract justice, but of applying a rule of law which itself requires the application of equitable principles . . .*"².

143. In discussing the role of equity in delimitation, the Court contrasted the application of equity as a legal concept involving the application of equitable principles with the application of equity involving a decision *ex aequo et bono*:

"Whatever the legal reasoning of a court of justice, its decisions must by definition be just, and therefore in that sense equitable. Nevertheless, when mention is made of a court dispensing justice or declaring the law, what is meant is that the decision finds its objective justification in considerations lying not outside but within the rules, and in this field it is precisely a rule of law that calls for the application of equitable principles. There is consequently no question in this case of any decision *ex aequo et bono*, such as would only be possible under the conditions prescribed by Article 38, paragraph 2, of the Court's Statute³."

¹ *I.C.J. Reports 1969*, p. 22, para. 19. [Initial and final emphasis added.] See also p. 22, para. 20.

² *I.C.J. Reports 1969*, pp. 46-47, para. 85. [Emphasis added.]

³ *I.C.J. Reports 1969*, p. 48, para. 88.

The holdings in the *North Sea Continental Shelf* cases thus are contrary to Canada's pursuit of a sharing out, or apportionment ¹.

B. THE *Anglo-French Arbitration*

144. The conclusions of the Court in the *North Sea Continental Shelf* cases were followed by the Arbitral Tribunal in the *Anglo-French Arbitration* ². With regard to "sharing out", the Arbitral Tribunal stated:

"The first of these conclusions was that delimitation of the continental shelf is not a question of apportionment, that is of awarding 'just and equitable' shares to each State in a common, as yet undelimited, area of shelf. On the contrary, delimitation is essentially a process of 'drawing a boundary line between areas which already appertain to one or other of the States affected' (I.C.J. Reports 1969, paragraph 20). *Accordingly, although the delimitation in the present case must be equitable, it cannot have as its object simply the awarding of an equitable 'share' in the continental shelf to each Party* ³."

The Arbitral Tribunal cited with approval the passage in the decision in the *North Sea Continental Shelf* cases that distinguished equity as a legal concept, involving application of equitable principles, from equity in the abstract sense, involving a decision *ex aequo et bono* ⁴. Thus, the *Anglo-French Arbitration* also is at variance with Canada's view of the law.

C. THE *Tunisia/Libya* CASE

145. The International Court of Justice in the *Tunisia/Libya* case ⁵ drew the same distinction:

"Application of equitable principles is to be distinguished from a decision *ex aequo et bono*. The Court can take such a decision only on condition that the Parties agree (Art. 38, para. 2, of the Statute), and the Court is then freed from the strict application of legal rules in order to bring about an appropriate settlement. The task of the Court in the present case is quite different: it is bound to apply equitable principles as part of international law,

¹ In this case, the Special Agreement between the Parties does not provide for any decision *ex aequo et bono*, and thus does not satisfy the conditions of Article 38 of the Statute of the Court.

² *Decisions of the Court of Arbitration*, 30 June 1977 and 14 March 1978 [hereinafter *Decisions*].

³ *Decisions*, p. 51, para. 78. [Emphasis added.]

⁴ *Decisions*, pp. 114-115, para. 245.

⁵ *I.C.J. Reports* 1982, p. 3.

and to balance up the various considerations which it regards as relevant in order to produce an equitable result. While it is clear that no rigid rules exist as to the exact weight to be attached to each element in the case, this is very far from being an exercise of discretion or conciliation; nor is it an operation of distributive justice¹.”

146. The decision in the *Tunisia/Libya* case is in accord with other adjudications involving the continental shelf in rejecting, as a matter of law, an equitable apportionment, or sharing out, as sought by Canada.

SECTION 2. Neither the *Fisheries Jurisdiction* Cases nor Cases Involving the Delimitation of Exclusive Fishing Zones Support Equitable Apportionment, or Sharing Out

147. Canada suggests that the judgments of the International Court of Justice in the *Fisheries Jurisdiction* cases approved the equitable apportionment, or sharing out, of the resources of the area to be delimited². Neither those cases nor international adjudications relating to exclusive-fishing rights supports such an interpretation.

A. THE *Fisheries Jurisdiction* CASES

148. The decisions in the *Fisheries Jurisdiction* cases did not involve the delimitation of any type of a maritime boundary³. Rather, they involved the adjudication of rights to fish in the high seas beyond the internationally recognized exclusive-fishing zone.

149. The *Fisheries Jurisdiction* cases arose after the United Kingdom and the Federal Republic of Germany challenged the extension by Iceland of its exclusive-fishing zone from twelve to fifty nautical miles from its coast. The International Court of Justice did not determine the validity of this extension. The Court instead held that each Party could continue to fish in the high seas within the newly extended zone claimed by Iceland, but that Iceland was entitled to a “preferential share” within those waters⁴.

150. The Court did not base its decision upon what was then an emerging concept under international law, that of exclusive coastal-State jurisdiction over the fishery resources of the adjacent seas. Rather, the Court founded its decision upon the concept of the preferential rights of

¹ *I.C.J. Reports* 1982, p. 60, para. 71.

² Canadian Memorial, para. 286.

³ *Fisheries Jurisdiction (United Kingdom v. Iceland) (Federal Republic of Germany v. Iceland)*, *Merits, Judgment*, *I.C.J. Reports* 1974, p. 3, p. 175, respectively.

⁴ *I.C.J. Reports* 1974, p. 34, para. 79 [*dispositif*].

the coastal State in a high-seas fishery lying beyond any recognized zone of exclusive coastal-State jurisdiction. The Court drew a clear distinction between the two:

"Two concepts have crystallized as customary law in recent years arising out of the general consensus revealed at that [the 1958 Geneva] Conference [on the Law of the Sea]. The first is the concept of the fishery zone, the area in which a State may claim exclusive fishery jurisdiction independently of its territorial sea; the extension of that fishery zone up to a 12-mile limit from the baselines appears now to be generally accepted. The second is the concept of preferential rights of fishing in adjacent waters in favour of the coastal State in a situation of special dependence on its coastal fisheries, this preference operating in regard to other States concerned in the exploitation of the same fisheries. . . .¹"

151. Thus, the *Fisheries Jurisdiction* cases addressed the "preferential rights" of the coastal State to the fishery resources of the high seas and not the subject matter of this case, namely, the delimitation of a zone of exclusive coastal-State jurisdiction. The Court elaborated upon the concept of preferential rights in the context of determining relative rights in an area over which no State could claim exclusive authority. On the one hand, the determination of a preferential right necessarily involves the balancing of the rights of the coastal State with those of other States. The determination of an exclusive fishing zone, on the other hand, accords exclusive jurisdiction based upon delimitation. Thus, in contrast to the situation in the *North Sea Continental Shelf* cases, the Court in the *Fisheries Jurisdiction* cases was called upon to enunciate a principle for allocating rights in an area that does not appertain to any State. The concept of preferential rights can have no application in the context of a boundary delimitation, where the task is to determine the limits of areas that appertain to the States involved.

152. In the *Fisheries Jurisdiction* cases, the Court was aware that the concept of the preferential rights of the coastal State in high-seas fisheries might eventually be superseded by that of the 200-nautical-mile exclusive-fishing zone². Indeed, since the decisions in those cases, international law has recognized the 200-nautical-mile exclusive-fishing zone³. Accordingly, the *Fisheries Jurisdiction* cases do not support Canada's argument that delimitation of the single maritime boundary in an area subject to the exclusive fishing jurisdiction of a State requires an equitable sharing out of the resources of that area.

¹ *I.C.J. Reports* 1974, p. 23, para. 52.

² *I.C.J. Reports* 1974, pp. 19-20, para. 40; pp. 23-24, para. 53.

³ As the Court noted in the *Tunisia/Libya* case, the exclusive zone "may be regarded as part of modern international law". *I.C.J. Reports* 1982, p. 74, para. 100.

B. THE *Grisbadarna* CASE

153. The *Grisbadarna* case¹, which involved the delimitation of the maritime boundary between Norway and Sweden, and thus their exclusive-fishing zones as well, similarly rejects the notion of an equitable sharing out of resources. The dispute between Norway and Sweden concerned their respective rights to two groups of fishing banks, the *Grisbadarna* banks and the three *Skjottegrunde* banks. There was evidence presented that both nations had engaged in substantial fishing activities over a considerable period of time on all of those banks. Nevertheless, the Arbitral Tribunal did not base its determination of the boundary (which it set as an adjusted perpendicular line to the general direction of the coast) upon the notion of an equitable sharing out of resources. Rather, the Tribunal awarded the *Grisbadarna* banks in their entirety to Sweden². Figure 20. The Tribunal arrived at that result on the basis of the "all of several circumstances of fact which were pointed out during the discussion"³, including, in particular, fishing on the *Grisbadarna* banks that had been "carried on for a much longer time, to a much larger extent, and by a much larger number of fishermen by the subjects of Sweden than by the subjects of Norway"⁴. The decision in that case was based upon equitable principles, and not upon any notion of equity in its abstract sense⁵.

C. THE *Anglo-Norwegian Fisheries* CASE

154. In the *Anglo-Norwegian Fisheries* case⁶, the International Court of Justice similarly disregarded the notion of any equitable sharing out. That case involved a challenge by the United Kingdom of Norway's delimitation of its exclusive-fishing zone. The United Kingdom argued that the limits claimed by Norway were unnecessary to protect Norwegian fishermen, and would encompass areas of the high seas within which fishermen from the United Kingdom had been fishing for more than four

¹ For text in French, see 11 R. Int'l Arb. Awards 147. Hague Ct. Rep. (Scott), 1916, p. 121, reprinted at United States Memorial, Annex 4, Vol. I.

² See the discussion of this case in United States Memorial, paras. 172-180.

³ *Grisbadarna*, Hague Ct. Rep. (Scott), 1916, p. 130 (45th Whereas).

⁴ United States Memorial, para. 180. Indeed, in the *Grisbadarna* case, both Parties agreed that the task of the Tribunal was to pronounce a judgment of "law" and not of "peace". *Recueil des Comptes rendus de la visite des lieux et des Protocoles des séances du Tribunal arbitral, constitué en vertu de la Convention du 14 Mars 1908, pour juger la question de la délimitation d'une certaine partie de la frontière maritime entre la Norvège et la Suède*, Van Langenhuyzen Freres, The Hague, 1909, pp. 231, 285, and 316.

⁵ *Fisheries case (United Kingdom v. Norway)*, Judgment, I.C.J. Reports 1951, p. 116.

decades¹. The Court applied equitable principles, taking account of both geographical considerations and the longer and fuller development of the fisheries by Norway, and confirmed exclusive Norwegian jurisdiction over the entire area².

155. No adjudication that has dealt with delimitation of exclusive fishing zones requires, or even contemplates, an equitable apportionment, or sharing out, of resources.

SECTION 3. The Convention Adopted by the Third United Nations Conference on the Law of the Sea Rejects Equitable Apportionment, or Sharing Out, As a Basis for Delimitation

156. The Convention adopted by the Third United Nations Conference on the Law of the Sea addresses in identical terms the delimitation of both the continental shelf and the exclusive economic zone³. Articles 74(1) and 83(1) provide in combination:

“The delimitation of the [exclusive economic zone/continental shelf] between States with opposite or adjacent coasts shall be effected by agreement on the basis of international law, as referred to in Article 38 of the Statute of the International Court of Justice, in order to achieve an equitable solution⁴.”

Under the Convention, Article 38 of the Statute of the Court determines the international law that will govern delimitation. Article 38 identifies the following as the sources of international law: conventions, international custom, general principles of law, judicial decisions, and the teachings of publicists. Unless independently authorized, Article 38 permits a decision *ex aequo et bono* only upon the agreement of the Parties.

¹ *I.C.J. Pleadings, Fisheries case*, Vol. II, p. 13, para. 11 and pp. 411-412, para. 134 (Reply of the United Kingdom).

² *I.C.J. Reports 1951*, pp. 133 and 143.

³ On 9 July 1982, the United States announced its decision not to sign the Law of the Sea Convention. That position was adopted because of problems in the Convention's deep seabed mining provisions. On 10 March 1983, the United States stated publicly that “the Convention also contains provisions with respect to traditional uses of the oceans which generally confirm existing maritime law and practice and fairly balance the interests of all States”. In that connection, the United States established by proclamation an exclusive economic zone and indicated its willingness to “recognize the rights of other States in the waters off their coasts, as reflected in the Convention, so long as the rights and freedoms of the United States and others under international law are recognized by such coastal States”. For the Statement of the President of 9 July 1982, the Statement of the President of 10 March 1983, and the Exclusive Economic Zone Proclamation of 10 March 1983, see Annex 28, Vol. V.

⁴ United Nations Convention on the Law of the Sea, opened for signature 10 Dec. 1982. U. N. Doc. A/Conf. 62/122.

Equitable apportionment or, sharing out, of an area is a decision *ex aequo et bono*. As demonstrated above, neither the law relating to delimitation of the continental shelf or of exclusive fishing zones, nor any treaty or other source of international law generally applicable to the delimitation of the single maritime boundary beyond the territorial sea, authorizes such a decision. Consequently, under the new Convention, the continental shelf and exclusive economic zone cannot be apportioned in the absence of an agreement between the States concerned.

SECTION 4. Conclusion

157. The Fundamental Rule governing delimitation of maritime boundaries, acknowledged by Canada, requires the identification and application of equitable principles, taking account of relevant circumstances. Canada nonetheless suggests that this Court is authorized to render a decision that equitably apportions, or shares out, the area to be delimited in this case on the basis of certain "factors" or circumstances. In effect, Canada claims that this Court may ignore the requirement to apply equitable principles.

158. The Parties have not consented to a decision *ex aequo et bono*, and the United States does not do so now. As provided in the Special Agreement between the Parties, the Chamber must arrive at its decision through the application of principles and rules of international law¹.

¹ Special Agreement, *supra* para. 138, n. 1, at Art. 1.

CHAPTER II

CANADA RELIES UPON REJECTED INTERPRETATIONS OF THE LAW GOVERNING THE DELIMITATION OF MARITIME BOUNDARIES

159. In its Memorial, Canada relies upon interpretations of the law governing delimitation of maritime boundaries that have been rejected by the International Court of Justice, by other international tribunals, and by the Third United Nations Conference on the Law of the Sea. Canada contends erroneously that the *Anglo-Norwegian Fisheries* case and the *Fisheries Jurisdiction* cases support the relevance of economic dependence as a consideration in delimiting maritime boundaries, and suggests that the relative wealth or poverty of the Parties is also relevant. Those cases do not support the relevance of either of those considerations to the delimitation of a single maritime boundary. Furthermore, both considerations were expressly and recently rejected in the *Tunisia/Libya* case.

160. Canada also argues erroneously that proximity is the preferred basis of delimitation of maritime boundaries. On the contrary, adjudications relating to the delimitation of the continental shelf, as well as the results of the Third United Nations Conference on the Law of the Sea, have rejected specifically any preferred status for proximity, either as a principle or as a method of delimitation.

SECTION 1. International Law Rejects Economic Dependence and Relative Wealth as Considerations Relevant to a Delimitation Between Neighboring States

161. Canada submits that:

“... the economic dependence associated with established patterns of exploitation of the fisheries of the disputed area must be given a special weight in the balancing-up of all the relevant circumstances if a truly equitable result is to be achieved”¹.

Canada goes so far as to assert that economic dependence may be a sufficient basis for ignoring entire portions of the coast of a Party otherwise relevant for the purpose of delimitation².

162. Canada concedes that neither “economic interests in the abstract” nor “indeterminate considerations of relative national wealth and poverty” are to be taken into account in the delimitation of a single maritime boundary³, and yet Canada relies in its arguments upon those very

¹ Canadian Memorial, para. 311.

² Canadian Memorial, para. 317.

³ Canadian Memorial, para. 316.

factors. Canada refers to the "present and prospective economic importance" of Georges Bank¹ and asserts, incorrectly, that Georges Bank has "special economic significance" to Canada that is without parallel in the United States². In this regard, Canada, in its Memorial, incorrectly portrays Nova Scotia as a deprived region with limited economic alternatives to fishing on Georges Bank, which it contrasts with what it describes as the wealthy, diverse economy of New England³.

163. The introduction of these economic arguments by Canada necessarily raises issues concerning the past, present, and future development of the economies of both Parties. Analysis of such economic issues requires consideration of complex and speculative criteria, including, for example, economic growth, industrial diversification, population structure, energy use, investment, and development of external markets⁴.

164. Considerations of purported economic dependence and relative national wealth are extraneous to the delimitation of maritime boundaries. Boundaries between States are permanent. They must not be based on the one hand upon variable and speculative factors. On the other hand, long usage of the resources in the area to be delimited is relevant. Although motivated by economic considerations, patterns of activities relating to the exploitation of resources consistently have been viewed as relevant, not because they bear any relationship to economic dependence or relative wealth, but because they occur in the area in dispute.

165. No adjudication recognizes the relevance of relative national wealth to a delimitation of a maritime boundary between neighboring States. None of the adjudications upon which Canada relies supports the Canadian argument that considerations of economic dependence may be used to refashion nature.

166. In particular, Canada's reliance upon the *Fisheries Jurisdiction* cases is misguided. The Court in those cases considered economic dependence in unusual circumstances pertaining to the widely-recognized special dependence of the entire economy of Iceland upon the fishery resources of the high seas off its coasts. It did not do so, however, in the context of delimiting a maritime boundary. In that case, the Court referred to the concept of preferential rights in determining the respective fishing rights of the coastal State and of distant-water States in the high seas beyond the limits of exclusive coastal-State jurisdiction. As noted above, the concept of preferential rights in the fishery resources of the high seas has been superseded by the emergence of the 200-nautical-mile exclusive fishing zone.

¹ Canadian Memorial, para. 319.

² Canadian Memorial, para. 318.

³ Canadian Memorial, paras. 110-121.

⁴ See Annex 4, Vol. III, A Factual Analysis of the Socio-Economic Arguments in the Canadian Memorial.

A. INTERNATIONAL ADJUDICATIONS RELATING TO FISHING REJECT THE RELEVANCE OF ECONOMIC DEPENDENCE OR RELATIVE WEALTH TO THE DELIMITATION OF MARITIME BOUNDARIES

1. *The Anglo-Norwegian Fisheries Case*

167. Canada suggests that "the important and sometimes decisive role" of economic considerations in delimiting maritime boundaries "was a central theme" in the *Anglo-Norwegian Fisheries* case¹. To the extent that any of the issues addressed in that case may be identified as a "central theme", that theme would be that delimitations should reflect the geographical relationship of the relevant coasts to the maritime areas in front of those coasts, and, where applicable, historic fishing rights established by long usage.

168. In the *Anglo-Norwegian Fisheries* case, the United Kingdom argued that it was incumbent upon Norway, in delimiting its exclusive fishing zone, to follow the sinuosities of its coast. Norway claimed that international law did not prohibit the straight-baseline method that it had used. Norway argued further that its method was justified by the geographical circumstances of the unique Norwegian coast and by the need to safeguard the vital interests of its inhabitants. Finally, Norway contended that its system of straight baselines was valid under international law on the basis of historic usage. At issue were areas of water, rich in fish, where Norwegians had been fishing for centuries, and where vessels of the United Kingdom had resumed fishing some forty years earlier, after an absence of almost three centuries².

169. In upholding Norway's straight-baseline system, the Court identified three "basic considerations". The first two of these considerations were "purely geographical". One was the close dependence of the sea area in question upon the land domain. As the Court declared, "[i]t is the land which confers upon the coastal State a right to the waters off its coasts"³.

170. The other "purely geographical" consideration identified by the Court concerned the relationship between certain sea areas and land formations:

"Another fundamental consideration, of particular importance in this case, is the more or less close relationship existing between certain sea areas and the land formations which divide or surround them. The real question raised in the choice of baselines is in effect whether certain sea areas lying within these

¹ Canadian Memorial, para. 312.

² *I.C.J. Reports 1951*, p. 124.

³ *I.C.J. Reports 1951*, p. 133.

lines are sufficiently closely linked to the land domain to be subject to the regime of internal waters. This idea, which is at the basis of the determination of the rules relating to bays, should be liberally applied in the case of a coast, the geographical configuration of which is as unusual as that of Norway¹."

171. Only the third consideration identified by the Court related to economic interests:

"Finally, there is one consideration not to be overlooked, the scope of which extends beyond purely geographical factors: that of certain economic interests peculiar to a region, the reality and importance of which are clearly evidenced by a long usage²."

172. In commenting upon Norway's economic arguments, the Court did not focus on economic interests as an element of economic dependence. Rather, the Court focused upon such interests as the basis of traditional rights established by long usage:

"The Court considers that, although it is not always clear to what specific areas they apply, the historical data produced in support of this contention by the Norwegian Government lend some weight to the idea of the survival of traditional rights reserved to the inhabitants of the Kingdom over fishing grounds included in the 1935 delimitation, particularly in the case of LoppHAVET. Such rights, founded on the vital needs of the population and attested by very ancient and peaceful usage, may legitimately be taken into account in drawing a line which, moreover, appears to the Court to have been kept within the bounds of what is moderate and reasonable³."

173. Canada argues that the economic interests that have a legal relevance need not be "of the very long duration that might be required in support of a claim of historic title⁴". The Court in the *Fisheries* case, however, upheld Norway's straight-baseline system on the basis of traditional rights "attested by very ancient and peaceful usage⁵".

¹ *I.C.J. Reports 1951*, p. 133.

² *I.C.J. Reports 1951*, p. 133. The Court found that, to be relevant for delimitation, an economic interest must both be "clearly evidenced by long usage" and be "peculiar to the region". In this regard, Canada asserts that Georges Bank is of "special economic significance" to Canada "entirely without parallel in the United States". Canadian Memorial, para. 318. The United States interest in the area, historically and at present, far exceeds the recent and limited activities of Canada. See Part I, Chapter IV.

³ *I.C.J. Reports 1951*, p. 142.

⁴ Canadian Memorial, para. 316.

⁵ *I.C.J. Reports 1951*, p. 142.

The Court found that the fishing grounds at issue had been exploited by Norway from "time immemorial". The Court also found that Norway had used a system of straight baselines for *over eighty years*, without opposition from the United Kingdom or from other States. Accordingly, the Court held that the United Kingdom at that juncture could not be heard to object to that system².

2. The Fisheries Jurisdiction Cases

174. In the *Fisheries Jurisdiction* cases, Iceland claimed exclusive jurisdiction over fishing to a distance of fifty nautical miles from its coasts, both to conserve the fisheries and to protect the economy of Iceland, which was widely recognized as specially dependent upon those fisheries. The International Court of Justice held that Iceland's unilateral claim to exclusive jurisdiction was not opposable to the United Kingdom and the Federal Republic of Germany, but that Iceland was entitled to a preferential right to share in those high-seas fisheries³.

175. As previously noted, however, the decisions in the *Fisheries Jurisdiction* cases are not relevant to the present case. They did not concern the delimitation of maritime areas between neighboring States; rather, they involved the concept of the preferential rights of the coastal State to high-seas fishery resources⁴. That concept has been overtaken by the emergence of the 200-nautical-mile exclusive fishing zone, and is irrelevant to the delimitation of this maritime boundary.

3. The *Grisbadarna* Case

176. The Arbitral Tribunal in the *Grisbadarna* case identified certain circumstances relevant to delimitation, including the presence of separate and identifiable fishing banks, the degree to which the nationals of the two Parties had developed and exploited the fisheries on those banks, and the exercise by the Parties of responsibilities for safety of navigation in the area⁵. The Arbitral Tribunal did not consider purported economic

² *I.C.J. Reports* 1951, p. 127.

³ *I.C.J. Reports* 1951, p. 139. In contrast, substantial Canadian activity in the fisheries of the northeastern portion of Georges Bank first emerged only in the 1960s, and then only in regard to one species, scallops. United States Memorial, paras. 79-83. Moreover, continued access to Georges Bank is not, in the words of the *Anglo-Norwegian Fisheries* case, "vital" to the needs of the inhabitants of Canada generally, or of Nova Scotia, even if such a consideration were, as a matter of law, relevant to delimitation of a single maritime boundary. See Annex 4, Vol. III.

⁴ *I.C.J. Reports* 1974, p. 34, para. 79(4)(b).

⁵ *I.C.J. Reports* 1974, pp. 27-28, para. 62.

⁶ *Grisbadarna*, Hague Ct. Rep. (Scott), 1916, pp. 129-130.

dependence or the relative wealth of Norway and Sweden in delimiting the boundary separating their exclusive fishing zones. The Arbitral Tribunal considered the relative importance of fishing on the banks to the two nations to assist it in evaluating the evidence of the fishing activities of the two States on the banks. Upon that basis, the Tribunal concluded that the Grisbadarna banks had been used much earlier and more effectively by Sweden¹.

B. ADJUDICATIONS RELATING TO DELIMITATION OF THE CONTINENTAL SHELF REJECT THE RELEVANCE OF ECONOMIC DEPENDENCE OR RELATIVE WEALTH

177. Canada asserts that “[e]ven the law on continental shelf delimitation, in fact, strongly suggests that *established* resource interests in the disputed area are among the most important factors to be taken into account”, citing in support of this proposition the *North Sea Continental Shelf* cases and the *Tunisia/Libya* case². The decisions in the *North Sea Continental Shelf* cases and the *Tunisia/Libya* case, as well as that in the *Anglo-French Arbitration*, do not suggest that considerations of economic dependence or relative wealth are relevant to the delimitation of maritime boundaries. Furthermore, the recent decision in the *Tunisia/Libya* case expressly rejects the relevance of any such considerations.

1. The *North Sea Continental Shelf* Cases

178. In regard to the *North Sea Continental Shelf* cases, Canada claims that “the Court confirmed the relevance of the natural resources of the areas involved, ‘so far as known or readily ascertainable’ ”, suggesting that the Court thereby recognized the relevance of economic dependence to delimitation. The requirement in the *dispositif* of that case to consider known or readily ascertainable natural resources has no relation, however, to economic dependence or relative wealth. None of the Parties in the *North Sea Continental Shelf* cases based its argument upon such considerations. Even the Federal Republic of Germany, which argued that customary law required an equitable sharing out, or apportionment of the continental shelf, did not base its argument upon economic considerations. As the Court noted:

“It appeared, moreover, that whatever its underlying motivation, the claim of the Federal Republic was, at least ostensibly, to a just and equitable share of the space involved, rather than to a share of the natural resources as such, mineral or other, to be found in it . . . ”.

¹ *Grisbadarna*, Hague Ct. Rep. (Scott), 1916, p. 131 (46th Whereas).

² Canadian Memorial, para. 315. [Emphasis in original.]

³ Canadian Memorial, para. 315.

⁴ *I.C.J. Reports* 1969, p. 21, para. 17. The Netherlands and Denmark based their arguments upon geographical grounds, not upon economic considerations. *I.C.J. Reports* 1969, pp. 19-20, paras. 13 and 14.

179. The Court indicated that the existence of natural resources is not itself relevant to delimitation:

“... the question of natural resources is less one of delimitation than of eventual exploitation¹.”

Although the Court did not explain in that passage the relevance it attached to “eventual exploitation”, it subsequently made clear that its concerns in this regard related to the conservation of resources:

“The natural resources of the subsoil of the sea in those parts which consist of continental shelf are the very object of the legal régime established subsequent to the Truman Proclamation. Yet it frequently occurs that the same deposit lies on both sides of the line dividing a continental shelf between two States, and since it is possible to exploit such a deposit from either side, a problem immediately arises on account of the risk of prejudicial or wasteful exploitation by one or other of the States concerned²”.

This is the only context in which the Court discussed the exploitation of natural resources. The Court appears to have concluded that exploitation of natural resources is relevant to delimitation only to the extent of any problems that might be created should a unitary deposit be split between two States, and not as any measure of entitlement involving the purported economic dependence or relative wealth of the Parties.

2. The *Tunisia/Libya* Case

180. The Canadian Memorial states that:

“... the potential relevance of actual exploitation of known resources was alluded to by the Court in the *Tunisia-Libya Continental Shelf* case as an element that might be taken into account ‘in the process of weighing all relevant factors to achieve an equitable result’³”.

In that case, both Parties sought to rely upon economic considerations. The Court said:

“In their pleadings, as well as in their oral arguments, both Parties appear to have set so much store by economic factors in the delimitation process that the Court considers it necessary here to comment on the subject. Tunisia seems to have invoked

¹ *I.C.J. Reports* 1969, p. 21, para. 17.

² *I.C.J. Reports* 1969, p. 51, para. 97.

³ Canadian Memorial, para. 315. [Citation omitted.]

economic considerations in two ways: firstly, by drawing attention to its relative poverty vis-à-vis Libya in terms of absence of natural resources like agriculture and minerals, compared with the relative abundance in Libya, especially of oil and gas wealth as well as agricultural resources; secondly, by pointing out that fishing resources derived from its claimed 'historic rights' and 'historic waters' areas must necessarily be taken into account as supplementing its national economy in eking out its survival as a country. For its part, Libya strenuously argues that, in view of its invocation of geology as an indispensable attribute of its view of 'natural prolongation', *the presence or absence of oil or gas in the oil-wells* in the continental shelf areas appertaining to either Party should play an important part in the delimitation process¹."

The Court rejected the arguments of both Parties:

"The Court is, however, of the view that *these economic considerations cannot be taken into account* for the delimitation of the continental shelf areas appertaining to each Party. They are virtually 'extraneous factors since they are variables which unpredictable national fortune or calamity, as the case may be, might at any time cause to tilt the scale one way or the other. A country might be poor today and become rich tomorrow as a result of an event such as the discovery of a valuable economic resource. As to *the presence of oil-wells* in an area to be delimited, it may, depending on the facts, be an element to be taken into account in the process of weighing all relevant factors to achieve an equitable result²."

181. Thus, the Court's reference to the "*presence of oil-wells*" as a possible consideration in delimitation does not mean that the Court intended that considerations of economic dependence or relative wealth were to be considered relevant to delimitation. The presence of oil wells is evidence of the conduct of the Parties in the area. Libya's argument that oil and gas deposits "in the oil-wells" were a relevant consideration was rejected by the Court.

¹ *I.C.J. Reports 1982*, p. 77, para. 106. [Emphasis added.]

² *I.C.J. Reports 1982*, pp. 77-78, para. 107. [Emphasis added.] In stating that the presence of oil wells in an area to be delimited may be an element to be taken into account in weighing the relevant circumstances, the Court may have had in mind the unity of deposits. The Court in the *North Sea Continental Shelf* cases concluded that problems could arise on account of the risk of prejudicial or wasteful exploitation where a boundary splits a single deposit of natural resources. *I.C.J. Reports 1969*, pp. 51-52, para. 97.

182. Canada attempts to distinguish its arguments from this holding in the *Tunisia/Libya* case on the grounds that fishery resources are different from hydrocarbon resources. The Canadian Memorial states in this regard:

"Fishery resources differ from hydrocarbons in many important respects; but the most fundamental difference in the present case is that the fishery resources of the Gulf of Maine area are fully known and have become the basis of present livelihoods and economic dependence, and these resources are among the most important of the Atlantic seaboard. It is these facts more than anything else that distinguish the fishing interests in this case from the historic fishing rights and unpredictable economic variables that were discussed in the *Tunisia-Libya Continental Shelf* case. For here the economic interests in the fishery are directly in issue as the most crucial component of the case, and these interests cannot be compared with the prospective and hypothetical economic benefits that might result from a future discovery of as yet unknown resources ¹."

183. The distinction Canada attempts to draw is inconsistent with the Court's reasoning in the *Tunisia/Libya* case. Fishery resources do differ from hydrocarbons in many important respects. Nonetheless, the relative value of fishery resources to the Parties, or the relative economic dependence of the Parties upon those resources at any particular time, is subject to the "variables which unpredictable national fortune or calamity, as the case may be, might at any time cause to tilt the scale one way or the other" to the same degree as are the hydrocarbon resources of the continental shelf that were at issue in the *Tunisia/Libya* case ².

184. An example of such an "unpredictable national fortune or calamity" is the periodic collapse of the important anchovy fishery of Chile and Peru, and fisheries elsewhere, because of a natural phenomenon known as "El Niño", involving a sudden change in the temperature of ocean currents ³. Another example of unpredictable consequences is that result-

¹ Canadian Memorial, para. 313. [Citation omitted.]

² *I.C.J. Reports* 1982, pp. 77-78, para. 107. Canada apparently seeks to distinguish the *Tunisia/Libya* case on the ground that the fishery resources in the *Tunisia/Libya* case were not "squarely in the area of dispute", as they are in this case. A portion of the area containing the historic fisheries claimed by Tunisia was, in fact, within the disputed area, as were hydrocarbon resources. *I.C.J. Reports* 1982, pp. 83-84, para. 117. Canada also suggests that the historic fisheries at issue in the *Tunisia/Libya* case, unlike the fisheries at issue in this case, were not fully known and had not become the basis of present livelihoods and economic dependence. By their historic nature, the fisheries in the *Tunisia/Libya* case must be assumed to have been fully known. Moreover, as the Court noted, Tunisia argued that its historic fisheries were necessary "to eke out its survival as a country". *I.C.J. Reports* 1982, p. 77, para. 106.

³ See Annex 41, Vol. III, for recent newspaper reports about El Niño.

ing from the 1966 change in the policy of the Roman Catholic Church whereby eating meat on Friday was no longer forbidden. The market for fish substantially decreased, adversely affecting fish prices in the Gulf of Maine area and elsewhere¹. Indeed, the fishing industry in the Gulf of Maine area has undergone numerous changes in response to such variables as the introduction of new technology and changing markets². In particular, the Georges Bank scallop fishery is a comparatively recent development³. Thus, the value of fishery resources, as with other resources, is variable, unpredictable, and dependent upon a wide variety of human and natural factors. Moreover, as the Court in the *Tunisia/Libya* case noted⁴, the relative wealth of a State may change through the discovery of a valuable resource, as demonstrated by the recent discovery of important hydrocarbon deposits off Nova Scotia.

185. Finally, Canada attempts to distinguish the *Tunisia/Libya* case from the present case on the ground that this case involves rights in the exclusive fishing zone, and not merely those of the continental shelf. Canada suggests that, although economic dependence may not bear upon exclusive rights to continental shelf resources, it should be relevant to a delimitation of exclusive rights to fishery resources, which, until recently, have been open to all States⁵.

186. Canada provides no authority for the distinction it draws between the law relevant to the delimitation of the continental shelf and that relevant to the delimitation of the exclusive fishing zone. In fact, international law recognizes the exclusive rights of the coastal State both to the hydrocarbon resources of the continental shelf and to the fishery resources of the 200-nautical-mile exclusive fishing zone. Indeed, the emergence of the 200-nautical-mile exclusive fishing zone in international law has proven to be far more disruptive to established patterns of resource exploitation than has the development of the doctrine of the continental shelf. In the 10 years since the *Fisheries Jurisdiction* cases, many coastal States have expelled fishermen of other States who had fished in the waters of the newly established exclusive fishing zone for decades or even centuries. Canada has been in the forefront of these developments. Thus, Canada expelled New England fishermen from areas they had fished for centuries, and asserted control of the traditional European fishing grounds on the Grand Banks of Newfoundland, despite

¹ F. W. Bell, "The Pope and the Price of Fish", in *The American Economic Review*, 1968, Vol. 63, pp. 1346-1350, Annex 29, Vol. V.

² These changes include: the use of ice to preserve the catch, making possible the change from dried or salted to fresh fish; the expansion of markets through the development of transportation and marketing networks; and new vessels and processing techniques. United States Memorial, paras. 69-75.

³ See United States Memorial, para. 82.

⁴ *I.C.J. Reports* 1982, p. 78, para. 107.

⁵ Canadian Memorial, para. 314.

the previously "unquestioned legal right of access to the fisheries" by fishermen of other States. There is no basis for considering economic dependence in the context of delimitation. It was not considered relevant to the expulsion of foreign fishermen occasioned by the extension of coastal-State fisheries jurisdiction to 200 nautical miles.

C. CONSIDERATIONS OF ECONOMIC DEPENDENCE AND RELATIVE WEALTH
CANNOT BE USED TO REFASHION NATURE

187. In its Memorial, Canada argues:

"... in the case of a single maritime boundary, where fisheries interests represent the dominant component of the interests at stake, a somewhat modified approach to the notion of the 'relevant coasts' may be in order. It is true, of course, that these should exhibit an appropriate degree of adjacency and proximity to the disputed area. It is equally apparent that in a case of this nature it ceases to be appropriate to identify the relevant coasts and to assess their importance in a purely geometrical way, in terms of their abstract spatial characteristics, without regard to their actual reliance upon the resources of the area concerned. There must be, in other words, an interaction between the physical and the economic geography ...".

188. Canada offers no authority whatsoever for the notion that coasts that are otherwise relevant to delimitation become less relevant if the inhabitants of the coastal area do not rely upon the resources of the area to be delimited². There is no authority for this notion. It is directly contrary to the fundamental principle, acknowledged by Canada, that delimitation must reflect the relationship of the coast of the Parties to the area to be delimited. As the United States demonstrated in its Memorial, this principle is a common element in the law relating to delimitation both of exclusive fishing zones and of the continental shelf³.

189. International law recognizes that the coastline is the starting point for title to, and the delimitation of, maritime areas. The Convention on the Territorial Sea and the Contiguous Zone provides that those areas are to be delimited on the basis of the geographical coastline⁴. There is no le-

¹ Canadian Memorial, para. 317.

² Canada relies upon this argument to ignore the coasts of Maine and New Hampshire in delimiting the boundary seaward of the Gulf of Maine. Since vessels from Maine and New Hampshire have historically fished, and fish today, on Georges Bank, Canada erred in ignoring these coasts even under its incorrect interpretation of the law. See Part III, Chapter III, Section 5.

³ United States Memorial, paras. 239-246.

⁴ Convention on the Territorial Sea and the Contiguous Zone, U.N. Doc. A/CONF. 13/L.52, 516 U.N.T.S. 205. United States Memorial, Annex 5, Vol. I.

gal authority or factual basis for excluding any portion of a State's coast from delimitation of a territorial sea or contiguous zone merely because the inhabitants of that area do not use or are not dependent upon the resources of the adjacent seas. This same reasoning is reflected in the Convention adopted by the Third United Nations Conference on the Law of the Sea. The Convention considers only the geographical coastline as the starting point in delimiting the territorial sea, the contiguous zone, the exclusive economic zone, and, in part, the continental shelf¹. The utilization of resources by the coastal State is not a relevant consideration in the delimitation of any of these maritime zones.

190. The *Grisbadarna* case and the *Anglo-Norwegian Fisheries* case expressly recognized the relevance of the geographical coastline². The Court in the *North Sea Continental Shelf* cases affirmed that the extension of coastal-State jurisdiction over both the continental shelf and the water column of the contiguous zone rests upon the principle that the land dominates the sea³. Similarly, the Court in the *Tunisia/Libya* case, and the Arbitral Tribunal in the *Anglo-French Arbitration* case, stressed the importance of the geographical coastline to a maritime boundary delimitation⁴.

D. CONCLUSION

191. The adjudication of a boundary between States, whether on land or at sea, is intended to be a permanent delimitation. To the extent possible, such an adjudication should consider circumstances that are stable and predictable. Considerations of economic dependence and relative national wealth and poverty are variable and speculative. The facts and the analysis involved in any such comparisons are susceptible to many different interpretations. Moreover, national fortune or calamity or other circumstances could at any time tilt the scale one way or the other. Taking such considerations into account is likely to discourage States from submitting boundary disputes to adjudication, thereby undermining the peaceful settlement of disputes. As the Court in the *Tunisia/Libya* case correctly concluded, questions of economic dependence and relative wealth are extraneous and irrelevant to the delimitation of a maritime

¹ United Nations Convention on the Law of the Sea, opened for signature 10 Dec. 1982, Arts. 15, 33, 57, 74, 76, and 83.

² *Grisbadarna*, Hague Ct. Rep. (Scott), 1916, pp. 127-129; *I.C.J. Reports* 1951, p. 133. While the *Fisheries Jurisdiction* cases inquired into economic dependence, the decision addressed preferential rather than exclusive fishing rights, and did not delimit a boundary.

³ *I.C.J. Reports* 1969, p. 51, para. 96.

⁴ *I.C.J. Reports* 1982, p. 61, para. 73; *Decisions*, p. 93, para. 194.

boundary. Canada's arguments in this regard, therefore, must be rejected, both as a matter of law and pursuant to the Special Agreement between the Parties.

SECTION 2. The Equidistance Method is Neither Required Nor Preferred in the Delimitation of Maritime Areas

192. Although Canada denies that the equidistance method is either required or preferred for delimiting maritime boundaries¹, Canada nonetheless seeks to establish that method as inherently more equitable than any other². The arguments set forth by Canada in this regard are the same as those of the Netherlands and Denmark, that were rejected by the International Court of Justice in the *North Sea Continental Shelf* cases. In this case, Canada renews those rejected arguments. Canada suggests that the decision in the *North Sea Continental Shelf* cases has been superseded by the decision in the *Tunisia/Libya* case and by the emergence in the law of 200-nautical-mile zones³. Canada cites State practice as supportive of the notion that equidistance is a preferred method.

193. The *Tunisia/Libya* decision did not depart from the decision in the *North Sea Continental Shelf* cases. Rather, it agreed with the reasoning in that decision, and, in the process, rejected any preferred status for the equidistance method in the delimitation of maritime boundaries. Neither the evolution of 200-nautical-mile zones nor State practice has found equidistance as legally required or preferred.

A. THE ARGUMENTS SET FORTH BY CANADA TO SUPPORT A SPECIAL STATUS FOR THE EQUIDISTANCE METHOD WERE REJECTED IN THE *NORTH SEA CONTINENTAL SHELF* CASES

194. Canada seeks to establish a special status for the equidistance method by equating adjacency, as the source of title or jurisdiction to maritime areas, with proximity. Canada then suggests that the equidistance method most accurately reflects proximity.

195. In the *North Sea Continental Shelf* cases, Denmark and the Netherlands argued that adjacency, as an adjunct of appurtenancy, is the source of title to the continental shelf, and that the test of such adjacency is proximity. Both States contended that only an equidistant line could meet that test⁴. The Court rejected the arguments of Denmark and the Netherlands on two grounds. First, the Court held that "adjacency" is not

¹ Canadian Memorial, para. 359.

² Canadian Memorial, para. 357-366.

³ Canadian Memorial, para. 294.

⁴ *I.C.J. Reports 1969*, pp. 29-30, paras. 39-41.

the same as proximity¹. Second, it stated that the issue of title to maritime areas is different from the issue of delimitation of those areas.

196. The Court concluded that adjacency and similar terms used to describe claims to the continental shelf are imprecise:

"...terms such as 'near', 'close to its shores', 'off its coast', 'opposite', 'in front of the coast', 'in the vicinity of', 'neighboring the coast', 'adjacent to', 'contiguous', etc.,—*all of them terms of a somewhat imprecise character* which, although they convey a reasonably clear general idea, are capable of a considerable fluidity of meaning".

197. The Court specifically rejected proximity as the basis for title to submarine areas:

"They are near it of course; but this would not suffice to confer title, any more than, according to a well-established principle of law recognized by both sides in the present case, mere proximity confers *per se* title to land territory. What confers the *ipso jure* title which international law attributes to the coastal State in respect of its continental shelf, is the fact that the submarine areas concerned may be deemed to be actually part of the territory over which the coastal State already has dominion,—in the sense that, although covered with water, they are a prolongation or continuation of that territory, an extension of it under the sea. *From this it would follow that whenever a given submarine area does not constitute a natural . . . extension of the land territory of a coastal State, even though that area may be closer to it than it is to the territory of any other State, it cannot be regarded as appertaining to that State;—or at least it cannot be so regarded in the face of a competing claim by a State of whose land territory the submarine area concerned is to be regarded as a natural extension, even if it is less close to it*³."

198. Thus, the Court concluded that the geographical configuration of the coast is more important than proximity in determining whether a particular submarine area constitutes a natural extension of the land territory of the coastal State:

"Indeed, local geographical configuration may sometimes cause it to have a closer physical connection with the coast to which it is not in fact closest⁴."

¹ *I.C.J. Reports* 1969, pp. 30-31, para. 42.

² *I.C.J. Reports* 1969, p. 30, para. 41. [Emphasis added.]

³ *I.C.J. Reports* 1969, p. 31, para. 43. [Latter emphasis added.]

⁴ *I.C.J. Reports* 1969, p. 30, para. 41.

199. After distinguishing the concept of adjacency from that of proximity, the Court distinguished title to an area from delimitation of that area:

"The appurtenance of a given area, considered as an entity, in no way governs the precise delimitation of its boundaries . . .".

200. As regards equidistance, the Court said:

"... it clearly cannot be identified with the notion of natural prolongation or extension, since, as has already been stated (paragraph 8), *the use of the equidistance method would frequently cause areas which are the natural prolongation or extension of the territory of one State to be attributed to another, when the configuration of the latter's coast makes the equidistance line swing out laterally across the former's coastal front, cutting it off from areas situated directly before that front*".

Concluding that proximity is but a rationalization for equidistance, the Court in the *North Sea Continental Shelf* cases specifically rejected any required status for equidistance¹.

B. ADJUDICATIONS SUBSEQUENT TO THE *NORTH SEA CONTINENTAL SHELF* CASES LIKEWISE REJECT ANY SPECIAL STATUS FOR THE EQUIDISTANCE METHOD

201. Notwithstanding Canada's arguments, subsequent adjudications have not departed from the decisions in the *North Sea Continental Shelf* cases concerning the role of equidistance. Both the Arbitral Tribunal in the *Anglo-French Arbitration* and the Court in the *Tunisia/Libya* case adhered to the decisions of the International Court of Justice in the *North*

¹ *I.C.J. Reports 1969*, p. 32, para. 46.

² *I.C.J. Reports 1969*, pp. 31-32, para. 44. [Emphasis added.]

³ *I.C.J. Reports 1969*, p. 36, para. 56. As the Court stated:

"... it seems to the Court that the inherency contention as now put forward by Denmark and the Netherlands inverts the true order of things in point of time and that, so far from an equidistance rule having been generated by an antecedent principle of proximity inherent in the whole concept of continental shelf appurtenance, the latter is rather a rationalization of the former—an *ex post facto* construct directed to providing a logical juristic basis for a method of delimitation propounded largely for different reasons, cartographical and other. Given also that for the reasons already set out (paragraphs 40-46) the theory cannot be said to be endowed with any quality of logical necessity either, the Court is unable to accept it".

Sea Continental Shelf cases denying proximity, or equidistance, any required or preferred status in delimitation of continental shelf areas.

202. The Arbitral Tribunal in the *Anglo-French Arbitration* distinguished the question of coastal-State rights in the continental shelf based upon the principle of natural prolongation from "the problem of delimitation".¹ The Tribunal held that "the value to be attached to proximity as a method of delimitation depends on the individual circumstances of that case".

203. Although the International Court of Justice in the *Tunisia/Libya* case placed less reliance on the physical aspects of natural prolongation than the Court in the *North Sea Continental Shelf* cases, it recognized the continuing relevance of the principles of natural prolongation and nonencroachment as the basis for title to, or jurisdiction over, the continental shelf.² The Court did not look to proximity. Rather, it stressed the principle that the land dominates the sea, i.e., the principle that the status of submerged areas should reflect the relationship between coasts and the maritime areas in front of those coasts. Citing with approval the passage in the *North Sea Continental Shelf* cases rejecting proximity, the Court also distinguished the question of title to the continental shelf from that of delimitation.³ The Court specifically affirmed the decision in the *North Sea Continental Shelf* cases, holding that equidistance is not "either a mandatory legal principle, or a method having some privileged status in relation to other methods" of delimitation.⁴

204. Thus, the cases are consistent in their repeated and unequivocal rejection of any special status for the equidistance method.

C. THE ESTABLISHMENT OF 200-NAUTICAL-MILE ZONES ALSO DENIES ANY SPECIAL STATUS FOR EQUIDISTANCE

205. Canada also seeks to elevate the equidistance method to some legally required or preferred method of delimitation based upon the recent establishment of the 200-nautical-mile zones in international law. The 200-nautical-mile distance criterion, however, is a description of the outer limit of the jurisdiction that may be exercised by a coastal State over

¹ *Decisions*, p. 52, para. 79.

² *Decisions*, p. 53, para. 81.

³ *I.C.J. Reports 1982*, p. 61, paras. 73 and 74.

⁴ *I.C.J. Reports 1982*, pp. 46-47, para. 44.

⁵ *I.C.J. Reports 1982*, pp. 78-79, paras. 109-110.

maritime areas. As such, it is associated with title under international law rather than with delimitation between neighboring States. As the International Court of Justice in the *North Sea Continental Shelf* cases stressed, the issue of title is different from the delimitation of boundaries between States¹. The 1958 Convention on the Territorial Sea and the Contiguous Zone² and the 1958 Convention on the Continental Shelf³, as well as the Convention adopted by the Third United Nations Conference on the Law of the Sea, deal with both issues separately. The 200-nautical-mile criterion is found in the articles of the new Convention that deal with the title or jurisdiction of coastal States over the adjacent maritime areas. It does not appear in the articles that deal with delimitation of those areas⁴. The history of these articles demonstrates that the equidistance method is neither required nor preferred in delimitation of the continental shelf or exclusive economic zone.

206. The Third United Nations Conference on the Law of the Sea struggled to evolve a delimitation formula for the exclusive economic zone and the continental shelf that would prove acceptable to all States. It was acknowledged that this issue was one of the most difficult that the Conference addressed. A special negotiating group, Negotiating Group 7, was established to seek a solution.

207. The Conference, and Negotiating Group 7, was divided largely between those States that favored the equidistance method⁵ and those

¹ *I.C.J. Reports* 1969, p. 32, para. 46.

² Convention on the Territorial Sea and the Contiguous Zone, Articles 1, 12, and 24.

³ Convention on the Continental Shelf. Done at Geneva, on 29 April 1958, U.N. Doc. A/CONF. 13/L.55, 499 U.N.T.S. 311. Articles 1 and 6. United States Memorial, Annex 5, Vol. I

⁴ United Nations Convention on the Law of the Sea, *supra* para. 189, n. 1, Articles 57, 74, 76, and 83.

⁵ The States favoring the equidistance method were known as the "Group of 22". The name of the group evolved from the following States sponsoring an early proposal emphasizing the equidistance method: Bahamas, Barbados, Canada, Colombia, Cyprus, Democratic Yemen, Gambia, Greece, Guyana, Italy, Japan, Kuwait, Malta, Norway, Spain, Sweden, United Arab Emirates, United Kingdom, and Yugoslavia (joined later by Cape Verde, Chile, Denmark, Guinea-Bissau, and Portugal). That proposal provided:

"1. The delimitation of the Exclusive Economic Zone/Continental Shelf between adjacent or opposite States shall be effected by agreement employing, as a general principle, the median or equidistance line, taking into account any special circumstances where this is justified." (NG 7/2).

States that did not¹. The membership of these groups cut across both regional groups and groups of developed and developing countries. Those States favoring equidistance preferred a text implying that equidistance was the basic rule of delimitation. An early proposal by Canada and others that favored the use of equidistance, in the absence of special circumstances, provided:

"The delimitation of the Exclusive Economic Zone between adjacent and opposite States shall be effected by agreement employing, as a general rule, the median or equidistance line, taking into account special circumstances, where justified, in order to reach an equitable result²."

208. The Conference rejected this and similar proposals to afford equidistance a special status. In order to negate the inference of any special status for "equidistance", proposals were made to join the provision calling for the use of the equidistance method with a provision calling for the application of "equitable principles". For example, Article 61 of the Single Negotiating Text provided:

"1. The delimitation of the exclusive economic zone between adjacent or opposite States shall be effected by agreement in accordance with equitable principles, employing, where appropriate, the median or equidistance line, and taking account of all the relevant circumstances³."

209. This proposal, which was retained in subsequent drafts through the revised Informal Composite Negotiating Text of 28 April 1979⁴, was examined and discussed at length by Negotiating Group 7. It ultimately

¹ The States not favoring the equidistance method were known as the "Group of 29". The name of the group evolved from the following States sponsoring an early proposal emphasizing equitable principles: Algeria, Bangladesh, Benin, Burundi, Congo, France, Iraq, Ireland, Ivory Coast, Kenya, Liberia, Libyan Arab Jamahir-*iy*a, Madagascar, Maldives, Mali, Mauritania, Morocco, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Poland, Romania, Senegal, Syrian Arab Republic, *S*omalian Democratic Republic, Turkey, Venezuela, and Viet Nam. That proposal provided:

"1. The delimitation of the Exclusive Economic Zone (or Continental Shelf) between adjacent or/and opposite States shall be effected by agreement, in accordance with equitable principles taking into account all relevant circumstances and employing any methods, where appropriate, to lead to an equitable solution." (NG 7/10.)

² Amendment to paragraph 1 of Article 62, Informal Single Negotiating Text II; informal proposal by Canada, April, 1976.

³ U.N. Doc. A/CONF. 62/WP. 8/Part II.

⁴ Article 74 (1), Informal Composite Negotiating Text/Revision 1, U.N. Doc. A/CONF. 62/WP. 10/Rev. 1.

was rejected, however, primarily by the States seeking a special status for the equidistance method. Judge Manner, Chairman of Negotiating Group 7, summarized the work of the Group, as follows:

“ During the negotiations no agreement could be reached on any proposed text concerning the criteria to be applied in the delimitation of the exclusive economic zone or the continental shelf. This conclusion also applies to the respective formulation of articles 74 and 83 in the revised informal composite negotiating text. While the provision in the negotiating text has been supported by, or at least indicated to prove satisfactory to, a number of States, it has been described as quite unacceptable by the members of the group supporting the median line approach. Because of this firm refusal by a notable part of the members of the group to adopt the present formulation of paragraph 1 of articles 74 and 83 it is clear that it cannot be considered a text which could provide consensus on the issue ¹. ”

As a result, the Chairman of the Group suggested the following text:

“Article 83

1. The delimitation of the continental shelf between States with opposite or adjacent coasts shall be effected by agreement in conformity with international law. Such an agreement shall be in accordance with equitable principles, employing the median or equidistance line, where appropriate, and taking account of all circumstances prevailing in the area concerned ². ”

This formula, however, also was rejected, primarily by the group opposed to a special status for equidistance. As the spokesman for that group stated:

“... on a question which affected vital bilateral interests of States, the convention must realistically give expression to the current state of international law without changing it. . . . The text must accurately state current international law . . . ³. ”

210. Thus, a consensus not having been achieved on any formulation having reference to the equidistance method, the Conference President, in

¹ Third United Nations Conference on the Law of the Sea, *Official Records*, Vol. XIII, 24 Mar. 1980, pp. 76-77. U.N. Doc. A/CONF. 62/L.47.

² *Ibid.*, p. 78.

³ *Ibid.*, pp. 14-15 (2 Apr. 1980, Statement of Ambassador Hayes of Ireland to the 126th plenary meeting).

August, 1981, offered a new proposal, that was ultimately adopted, as follows:

Article 83

- "1. The delimitation of the continental shelf between States with opposite or adjacent coasts shall be effected by agreement on the basis of international law, as referred to in Article 38 of the Statute of the International Court of Justice, in order to achieve an equitable solution¹."

211. The rule established under Article 83 (and also under Article 74) of the United Nations Convention on the Law of the Sea provides that the States concerned are to arrive at an agreement based upon international law, subject only to the qualification that the delimitation should achieve an equitable solution. The application of equitable principles, as Canada acknowledges, is implicit in an equitable solution.

212. No mention is made in the aforementioned articles relating to the delimitation either of the continental shelf or of the exclusive economic zone of any method to be used in delimitation. This point is particularly relevant with reference to the equidistance method, in view of the repeated efforts throughout the Conference and in Negotiating Group 7 to endow that method with a special status. The Convention was adopted only after a text had been approved in which no mention was made of equidistance or any other particular method of delimitation. In the final text of the Convention, reference is made to international law as the basis for agreement of the States concerned. States remain free, however, to choose any method, without preferences or priorities, as long as an "equitable solution" is achieved. As the International Court of Justice concluded in relation to a draft of this provision in the *Tunisia/Libya* case:

"... the history of Article 83 of the draft convention on the Law of the Sea, leads to the conclusion that equidistance may be applied if it leads to an equitable solution; if not, other methods should be employed²".

213. In its Memorial, Canada seeks to have this Court do what the Court and the Third United Nations Conference on the Law of the Sea refused to do, i.e., to transform equidistance from one of a number of methods of delimitation into a preferred method.

D. STATE PRACTICE ALSO REJECTS EQUIDISTANCE AS THE LEGALLY REQUIRED OR PREFERRED METHOD OF DELIMITATION

214. Canada asserts that "a careful analysis of general international practice in the conclusion of delimitation agreements beyond the territorial sea" demonstrates that "the equidistance method produces an equitable

¹ U.N. Doc. A/CONF. 62/WP. 11, 27 Aug. 1981.

² *I.C.J. Reports* 1982, p. 79, para. 109.

result in the majority of cases". In support of this, Canada claims that "of 94 known maritime boundaries settled by agreement, 66 of them—almost 71% of the total—utilize the equidistance principle or a modification thereof for all or part of the boundary".

215. Contrary to Canada's arguments, international practice does not support the conclusion that "the equidistance method produces an equitable result in the majority of cases". Most boundaries in force are not equidistant lines or simplified equidistant lines². They employ other methods of delimitation in whole or in part, or modify the equidistance method in some respect to create an equitable solution. Moreover, the practice of States in similar geographical situations contradicts Canada's implied conclusion that application of the equidistance method would produce an equitable result in the Gulf of Maine area.

216. The United States has examined the lists of boundaries contained in the Appendix to the Canadian Memorial. The lists are reproduced, with comments by the United States, at Annex 8. Canada's first list identifies boundary agreements that use equidistance for "all or part of the boundary". This list, however, includes many agreements pertaining to boundaries that deviate substantially from the equidistant line. Notable among these are the continental shelf boundaries between the Federal Republic of Germany and Denmark in the North Sea, between the Federal Republic of Germany and the Netherlands in the North Sea, and that between France and Spain in the Bay of Biscay.

217. A close examination reveals that only a minority of the boundaries in force—37 per cent—are based exclusively upon a strict application of the equidistance method: of the 81 boundaries known to be in force as of 1 May 1983, only 30 use equidistant lines throughout the entire boundary³. Moreover, most maritime boundaries have not been delimited.

¹ Canadian Memorial, para. 362.

² A simplified equidistant line is an equidistant line on which the number of turning points has been reduced.

³ Annex 8, Vol. IV, Chapter II, lists boundaries according to their use or non-use of equidistant lines. It shows that 25 boundaries in force do not incorporate equidistant lines; 26 boundaries in force incorporate equidistant lines only in part; and 30 boundaries in force are simplified equidistant lines or entirely equidistant lines. For purposes of these statistics, each boundary is counted once, whether established by one agreement or several. Canada's statistics, on the contrary, count each agreement separately, whether or not several agreements might apply to the same boundary. Thus, for example, the continental shelf boundary between the Federal Republic of Germany and the Netherlands in the North Sea has been counted once by the United States and twice by Canada. The Canadian figures also include 13 agreements that have been signed but not ratified. The United States analysis includes only agreements that are in force. If all agreements are counted, whether or not such agreements have entered into force, as Canada does, there are 94 boundaries beyond the territorial sea for which agreements have been signed, of which 35 apply the equidistance method strictly or use simplified equidistance for the entire boundary. See Annex 8, Vol. IV.

Agreements are in force respecting less than 25 per cent of the potential maritime boundaries. Thus, States have agreed on the strict application of the equidistant method in less than eight per cent of the maritime boundary situations.

218. The majority of boundaries in force—63 per cent—are not equidistant lines or simplified equidistant lines. They employ other methods of delimitation in whole or in part, or modify the equidistance method in some respect in order to create an equitable solution.

219. A mere recitation of the boundaries that do or do not use equidistant lines is too simplistic an analysis to assist the Court in determining the method of delimitation to apply in a particular case. The law requires that a single maritime boundary be delimited in accordance with equitable principles, taking account of the relevant circumstances, to produce an equitable solution. Inasmuch as the circumstances of each boundary situation are unique, a method of delimitation that is equitable in one case may not produce an equitable solution in another case. For this reason, the Court in the *Tunisia/Libya* case stated that “there is no single obligatory method of delimitation”, and that:

“Any examination of methods, like the examination of applicable rules and principles, must take as starting-point the particular geographical situation, and especially the extent and features of the area found to be relevant to the delimitation¹.”

Thus, an analysis of State practice in maritime boundary delimitation must take into account the relevant facts or circumstances of each situation.

220. As the Court also observed in the *Tunisia/Libya* case, the practice of States in maritime boundary delimitation has been to apply the equidistance method only in those circumstances where it leads to an equitable result:

“The Court held in the *North Sea Continental Shelf* cases, which also concerned adjacent States, that the equidistance method of delimitation of the continental shelf is not prescribed by a mandatory rule of customary law (*I.C.J. Reports 1969*, p. 46, para. 83; p. 53, para. 101). On the other hand it emphasized the merits of this rule in cases in which its application leads to

¹ *I.C.J. Reports 1982*, pp. 79-80, para. 111.

² *Ibid.*, p. 82, para. 114.

an equitable solution. The subsequent practice of States, as is apparent from treaties on continental shelf boundaries, shows that the equidistance method has been employed in a number of cases. But it also shows that States may deviate from an equidistance line, and have made use of other criteria for the delimitation, whenever they found this a better way to arrive at an agreement. One solution may be a combination of an equidistance line in some parts of the area with a line of some other kind in other parts, as dictated by the relevant circumstances. Examples of this kind are provided by the 1977 arbitration on the Delimitation of the Continental Shelf between France and the United Kingdom, and by the Convention between France and Spain on the Delimitation of the Continental Shelves of the two States in the Bay of Biscay of 29 January 1974¹."

221. The practice of the United States and Canada also has been to use equidistance only in circumstances where it produces an equitable result². As stated in the United States Memorial:

"The equidistance method can, in appropriate circumstances, produce equitable results. The United States has used equidistance as a method to define certain of its maritime boundaries with neighboring States. This occurred in cases where the United States and the other State concerned agreed that equidistance produced an equitable solution in the relevant geographical and other circumstances of that case. Canada also has used equidistance in certain of its maritime boundary situations. In other cases, namely the pending delimitation with France concerning St. Pierre and Miquelon, and the proposed boundaries with Alaska, Canada has been a proponent of different methodologies³."

222. Those boundaries that are based upon a strict application of the equidistance method have involved areas that geographically are unlike the Gulf of Maine area, where the land boundary between adjacent States meets the sea in the far corner of a large coastal concavity. In addition, in most of the areas where the equidistance method has been strictly applied, the States are geographically opposite and there are no unusual features or special circumstances. Since the circumstances in this case differ substantially from those in other cases, it follows that equidistant

¹ *I.C.J. Reports* 1982, pp. 78-79, para. 109.

² Canada's discussion of State practice makes reference to offshore boundary delimitations between individual states within the United States under the Coastal Energy Impact Program (CEIP). Canadian Memorial, para. 361, n. 77. These are discussed in Annex 9, Vol. IV, in order to correct misunderstandings conveyed by the Canadian Memorial.

³ United States Memorial, para. 269.

boundaries do not provide a precedent for an equitable solution in the Gulf of Maine area.

223. Although it is difficult to derive generalizations about State practice in dissimilar areas, an analysis of State practice in geographically similar situations may yield insights into the method that the Court should apply in this case. Since the coastal configuration of the Gulf of Maine area is so irregular, there are few boundary agreements that involve areas that are geographically analogous. Three such agreements, which delimit the continental shelves in the North Sea and in the Bay of Biscay, are examined in Part III of this Memorial.

E. CONCLUSION

224. Canada's attempt to attribute special status to the equidistance method is contrary to the basic equitable principle that the boundary must respect the relationship between the coasts of the Parties and the maritime areas in front of those coasts. The equidistance method, because it makes distance from the nearest coastal points the sole determining factor, often gives disproportionate effect to slight coastal irregularities, and fails to take account of the broad geographical relationship of the land and the sea. The Court, in the *North Sea Continental Shelf* cases, recognized this tendency of the equidistance method to produce an inequitable result in situations where the coastline is irregular, particularly in the case of concave coastlines, as well as the tendency of an equidistant line to become more inequitable as it is extended seaward¹. The Court therefore concluded that the use of the equidistance method was not obligatory, and that the boundary must be delimited in accordance with equitable principles². The Arbitral Tribunal in the *Anglo-French Arbitration*, after expressing agreement with the Court's conclusions in the *North Sea Continental Shelf* cases³, delimited the boundary, not according to proximity, but in a manner that respected the basic relationship of the land and the sea⁴. Finally, in the *Tunisia/Libya* case, the

¹ *I.C.J. Reports 1969*, p. 49, para. 89.

² *I.C.J. Reports 1969*, pp. 53-54, para. 101 [*dispositif*].

³ *Decisions*, pp. 53 and 55, paras. 82 and 86.

⁴ The Tribunal's concern for the broad geographical relationship is evident in its remarks that the presence of the Channel Islands in the English Channel "... disturbs the balance of the geographical circumstances which would otherwise exist between the Parties in this region as a result of the broad equality of the coastlines of their mainlands", and that, in the Atlantic region, "... the two States abut on the same continental shelf with coasts not markedly different in extent and broadly similar in their relation to that shelf. . .". *Decisions*, p. 89, para. 183 and p. 114, para. 244.

Court confirmed that the “geographic correlation between coast and submerged areas off the coast is the basis of the coastal State’s legal title”¹, and that equidistance is not “either a mandatory legal principle, or a method having some privileged status in relation to other methods”². The survey of the practice of States in maritime boundary delimitation confirms the conclusion of the Court that “equidistance may be applied if it leads to an equitable solution”, and, if not, “other methods should be employed”³. In short, proximity, or equidistance, is only a method of delimitation, useful only in those situations where it would be consistent with the basic principle that the boundary must respect the relationship between the coasts of the Parties and the maritime areas in front of those coasts.

¹ *I.C.J. Reports 1982*, p. 61, para. 73.

² *I.C.J. Reports 1982*, p. 79, para. 110.

³ *I.C.J. Reports 1982*, pp. 78-79, para. 109.

CHAPTER III

UNRATIFIED, REJECTED TREATIES DO NOT CREATE LEGAL OBLIGATIONS OR RIGHTS AND UNDER INTERNATIONAL LAW CANNOT BE INVOKED TO THE PREJUDICE OF A NEGOTIATING STATE

225. Canada argues that the 1979 east coast fisheries agreement, which was not ratified and which was rejected by the United States because of its inequitable character, "sheds considerable light upon the equities of delimitation in this case"¹. More specifically, Canada asserts that the 1979 agreement:

"can . . . be taken into account as evidence of Canada's status as a coastal state in relation to Georges Bank, of Canada's established share in the Georges Bank fishery, and of the fundamental justice of a maritime boundary that will maintain this Canadian presence on the Bank"².

226. The United States submits that an agreement that was subject to ratification, but that was not ratified, does not create legal obligations or rights and cannot be invoked to the prejudice of a State that had negotiated and signed such an agreement.

227. Under customary international law, an unratified agreement gives rise to no international rights or duties. As Lord McNair states in his *Law of Treaties*:

"At any rate during the past century and a half there has been no legal duty upon a State to ratify a treaty signed by its representatives, unless, as sometimes happens, it may have contracted by treaty to sign and ratify any particular treaty or class of treaty which may be submitted to it Nor is there a moral obligation to ratify a treaty; for, as we have already indicated, the interval between signature and ratification has a definite purpose and usefulness. Basdevant describes ratification as *un acte libre*"³.

¹ Canadian Memorial, para. 261.

² Canadian Memorial, para. 276.

³ McNair, *Law of Treaties*, 1961, p. 135, quoting Basdevant at 15 *Hague Recueil des Cours* (1926), at 587.

228. The negotiation and conclusion of a document subject to subsequent ratification permit constitutional decisionmakers an opportunity to evaluate the instrument to determine whether it is in the best interests of the state. Such a process is a common practice in international law. It is recognized expressly in the Vienna Convention on the Law of Treaties¹, which, while not directly applicable here, reflects customary law on this question.

229. As Canada indicated in its Memorial, the 1979 agreement was negotiated in an attempt to facilitate settlement of the dispute between the Parties over the location of the single maritime boundary in the Gulf of Maine area², and provided that it would not enter into force until the ratifications of the Parties were exchanged³. Canada concedes that the instrument was never ratified⁴ and has never entered into force⁵. In this regard, Canada apparently agrees with the United States that the rejected and unratified 1979 agreement cannot create legal obligations or rights. As Canada states: "[n]on-ratification of the agreement means that the consequences of the boundary decision could now be more sweeping and immediate in their impact⁶." Canada also concedes that the failed agreement "cannot be resurrected⁷."

¹ The Convention on the Law of Treaties, U.N. Doc. A/CONF. 39/27, 23 May 1969, Articles 13-14. The Convention also provides that the signing of a treaty by the representative of a State is not sufficient to bind that State in the absence of an express agreement or mutual understanding to the contrary. Art. 12.

² Canadian Memorial, paras. 246-259 and 330-339.

³ Agreement between the Government of Canada and the Government of the United States of America on East Coast Fishery Resources, Washington, 29 March 1979. Article XXV, Canadian Memorial, Annex 20, Vol. I, pp. 290-291. Article XXV provided: "This Agreement shall be subject to ratification in accordance with the domestic requirements of the Parties and shall enter into force on the date instruments of ratification . . . are exchanged". Canada well understood that the United States Constitution requires the advice and consent of the United States Senate before a treaty can be ratified.

⁴ Canadian Memorial, para. 257. The President of the United States promptly submitted the instrument to the ratification processes of the United States. When it became obvious that the required advice and consent of the United States Senate could not be obtained, the President withdrew the instrument from the ratification process, and notified the Canadian government of the failure of that particular effort to resolve the dispute between the two States. In this instance, the constitutional decisionmakers of the United States determined that the instrument was unbalanced and would have yielded unwarranted concessions to Canada. See Part III, Chapter III, Section 5.

⁵ Canadian Memorial, para. 261.

⁶ Canadian Memorial, para. 262.

⁷ Canadian Memorial, para. 276.

230. Canada, nonetheless, asserts that the terms and conditions of that rejected and unratified agreement are relevant to the determination of the single maritime boundary in the Gulf of Maine area ¹. Should Canada's position be accepted by the Court, it would render disputes infinitely more resistant to solution.

231. A fundamental requirement of international order is that States must resolve their disputes by peaceful means. As Article 2 of the Charter of the United Nations provides:

"All members shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered ²."

In a legal order lacking universal, compulsory, and binding mechanisms for the third-party resolution of disputes, negotiation necessarily must be the principal means by which States seek to settle their differences. Any acceptance of the terms and conditions of the rejected and unratified 1979 agreement in this case effectively would undermine the significance of parliamentary review and ratification, and would impede substantially the resolution of disputes by negotiation. States careful to safeguard their rights would, in many cases, be discouraged even from seeking a negotiated resolution of any dispute ³.

232. The Court consistently has recognized the need to avoid erecting barriers to the negotiated settlement of international disputes, as contemplated by Article 2 of the Charter of the United Nations. In this regard, the Court has ensured that no State's rights are prejudiced by the good-faith pursuit of a negotiated solution.

233. Thus, the Court has refused to receive or to consider evidence of proposals that were made in the course of settlement negotiations, but that

¹ Canadian Memorial, paras. 261 and 276. As demonstrated in Part III, Chapter III, Section 5, irrespective of whether the failed 1979 agreement is regarded as having some legal effect, the terms and conditions of the failed agreement do not support Canada's contentions.

² Article 2(3) of the Charter of the United Nations.

³ Not only was the agreement signed with an express provision for ratification, but the negotiations leading to that instrument were subject to the same *ad referendum* limitation. Statements made or positions taken in the course of the negotiation of such a rejected and unratified agreement should be inadmissible in this proceeding, despite Canada's unwarranted efforts in its Memorial to use such negotiations to the prejudice of the United States. Canadian Memorial, para. 323. Even if the instrument had been ratified, the negotiating history would have been admissible only for very limited purposes. Convention on the Law of Treaties, Art. 32. It follows, *a fortiori*, that any information that could not properly be used to interpret a ratified agreement cannot be used with respect to an agreement that has been rejected.

subsequently were rejected. As the Permanent Court of International Justice in the *Chorzów Factory* case observed:

"[The Court] cannot take account of declarations, admissions or proposals which the Parties may have made in the course of direct negotiations which have taken place between them, declarations which, moreover, have been made without prejudice in the event of the points under discussion forming the subject of judicial proceedings. For the negotiations in question have not, as acknowledged by the representatives before the Court of the Parties themselves, led to an agreement between them".

Similarly, in the case of the *Diversion of Water from the River Meuse*¹, the Court declined to consider, or even to accept in evidence, drafts resulting from ultimately unsuccessful negotiations. It is noteworthy that the principle that courts should not consider settlement offers as evidence of the validity of claims has been accepted by the legal systems both of the United States² and of Canada³.

234. Decisions of this Court have repercussions extending far beyond the parties to a particular dispute. Acceptance of Canada's position that the purported terms of a negotiated but unratified agreement may be used to prejudice the rights of a negotiating State is incompatible with the fundamental purpose of this Court, as well as contrary to a clear line of precedent and authority.

¹ *Case concerning the Factory at Chorzów*, (Claim for Indemnity) (Jurisdiction), *P.C.I.J.*, Ser. A, No. 8, 1927, p. 19.

² *P.C.I.J.*, Ser. A/B, No. 70, 1937, p. 4.

³ In the United States, an offer to compromise a claim is not admissible in evidence as an admission of the validity or invalidity of the claim. Fed. Rules of Evid. 408, 28 U.S.C.A. There are two generally recognized reasons for the rule. First, "[t]he evidence is irrelevant, since the offer may be motivated by a desire for peace rather than from any concession of weakness of position". Second, public policy favors the compromise and settlement of disputes. Notes of Advisory Committee on Proposed Rules, 28 U.S.C.A., Rule 408, p. 163. Annex 30, Vol. V.

⁴ Canadian law provides for the exclusion of offers of compromise. Communications made "without prejudice" in furtherance of the settlement of a dispute may not be introduced into evidence. H. Glasbeek, *Evidence-Cases and Materials*, 1977, p. 299. Annex 31, Vol. V.

CHAPTER IV

CANADA FAILS TO ADDRESS ALL OF THE FUNDAMENTAL REQUIREMENTS OF THE DOCTRINES OF ACQUIESCENCE AND ESTOPPEL AND FAILS TO SATISFY THOSE REQUIREMENTS THAT IT DOES ADDRESS

235. Canada contends that the United States, by its alleged conduct with regard to oil and gas exploration permits issued by Canada in the mid-1960s, has acquiesced in the use of the equidistance method for delimiting the maritime boundary in the Gulf of Maine area¹. Canada also contends that it relied to its detriment upon that alleged conduct of the United States, and that, as a result, the United States is estopped from objecting to such a boundary². The United States submits that the Canadian Memorial fails to address essential aspects of the doctrines of acquiescence and estoppel, while also failing to satisfy those aspects that it does address³.

236. The United States accepts the Canadian definition of acquiescence:

“... tacit acceptance of a certain legal position as a result of a failure to make a reservation of rights at the appropriate juncture”⁴.

Canada does not discuss fully, however, either the notoriety of conduct that is required to establish that a claim has been asserted, or the clarity of conduct that is required to establish that there has been an acceptance of such a claim. Canada also omits a thorough discussion of the authority that is required of an individual before the conduct of that individual can be deemed to bind a State. Finally, the Canadian Memorial does not adequately consider the duration of conduct or the detrimental reliance that is required. As the United States demonstrates in the application of the law to the facts in Part III, Chapter I, of this Counter-Memorial, the conduct of Canada and of the United States with regard to Canadian oil and gas permits relating to Georges Bank from 1965 to 1969 fails to satisfy any of the requirements for the application of the doctrines of acquiescence and estoppel, both as a matter of fact and as a matter of law.

¹ Canadian Memorial, para. 428(h). *See also* paras. 387 and 427.

² Canadian Memorial, para. 419.

³ *See* Part I, Chapter VII, for a discussion of the facts relating to the United States conduct in response to those Canadian permits.

⁴ Canadian Memorial, para. 414. *See also* para. 412.

SECTION 1. The Doctrines of Acquiescence and Estoppel Require Clear and Unambiguous Conduct, Not Only By the State Asserting the Doctrines, But Also By the State Against Which the Assertion is Made

237. The conduct of the State asserting a right or claim and the State opposing such a right or claim are both critical to the establishment of acquiescence and estoppel. There is inherent in the doctrines the dual requirement that a claim must have been made and accepted. In the absence of an unequivocal claim, a State is under no obligation either to give or to withhold its consent. Similarly, in the absence of an unequivocal acceptance, a claim is no more than a unilateral act having no legal consequence. As the Court stated in the *Tunisia/Libya* case:

“... an attempt by a unilateral act to establish international maritime boundary lines regardless of the legal position of other States is contrary to recognized principles of international law ...¹”.

238. In accordance with the doctrines of acquiescence and estoppel, the claim must be made in a manner, and in such circumstances, that the other State has been placed on notice of that claim. The conduct that allegedly constitutes acquiescence in, or tacit acceptance of that claim likewise must be clear and unequivocal. Moreover, the satisfaction of this dual requirement is not to be inferred lightly. As one commentator has stated:

“Perhaps the safeguard most necessary to a realistic and acceptable application of the doctrine of acquiescence lies in the demand that it be interpreted strictly. The purpose of insisting on circumspection in inferring the consent of a State from its inaction is to ensure that such acquiescence corresponds accurately with the implied intention of the acquiescing State, and to limit the benefits of acquiescence to claims which have been formulated in such a way that the acquiescing State has or ought to have knowledge of them².”

Thus, a State seeking to rely upon the doctrines of acquiescence and estoppel must demonstrate that both the assertion of the claim and the purported tacit acceptance of that claim are unassailable.

¹ *I.C.J. Reports* 1982, p. 66, para. 87.

² I. MacGibbon, “The Scope of Acquiescence in International Law”, in *British Yearbook of International Law*, Vol. 31, 1954, pp. 143, 168-169. Professor Bowett, in his study “Estoppel before International Tribunals and its Relation to Acquiescence”, declares that the leading cases on estoppel illustrate “the principle that an estoppel can only rest upon a statement which in its meaning is clear and unambiguous ...”. *British Yearbook of International Law*, Vol. 33, 1957, pp. 176, 188.

239. This twofold requirement is supported by the decisions of the International Court of Justice in the *Anglo-Norwegian Fisheries* case and in the *Temple of Preah Vihear* case, both of which Canada cites in its Memorial. In its discussion of those cases, Canada refers to the conduct that was held to have constituted tacit acceptance of a claim. Canada fails, however, to discuss the conduct that was found in those cases to have constituted assertion of a claim¹.

240. In the *Anglo-Norwegian Fisheries* case², the United Kingdom challenged Norway's use of straight baselines to delimit its exclusive fishing zone. In upholding Norway, the Court found that the United Kingdom long had been aware of Norway's system and its implications for British fishermen, but that it had failed to make a timely protest. The Court stressed that Norway had established its baseline system through the promulgation of official decrees of the Norwegian Parliament, which "clearly described" that system³.

241. In the *Temple of Preah Vihear* case⁴, the Court found that the failure of Thai authorities to object to a map depicting a boundary line between Thailand and Cambodia amounted to acquiescence on the part of Thai officials in the location of that boundary. Cambodia's claim in that case was based principally upon the depiction of the boundary line on a map prepared jointly by both States in connection with the conclusion of a treaty delimiting that boundary. The map evidenced in graphic form the extent of the Cambodian claims, and was provided directly to Thai authorities responsible for boundary questions. The Court held that Thailand not only accepted that map at the time of its preparation, but subsequently failed to object to the map on numerous occasions where it reasonably could have been expected to do so⁵.

¹ Canadian Memorial, paras. 414 and 415.

² *I.C.J. Reports 1951*, p. 116.

³ *Ibid.*, p. 139; see also MacGibbon, *op. cit.*, p. 169.

⁴ *Case concerning the Temple of Preah Vihear (Cambodia v. Thailand), Merits, Judgment of 15 June 1962, I.C.J. Reports 1962*, p. 6.

⁵ The map in question had been prepared by a Mixed Commission comprised of both Thai and French authorities, without objection by the Thai members. Subsequently, Thai officials failed to protest the map on the following occasions: receipt of the map in 1908 by the Thai provincial governor for the relevant area; a 1909 meeting of a Commission of Transcription made up of representatives from both States; a 1930 visit to the Temple by a Thai prince, a former Minister of the Interior, and who then, as the official responsible for national monuments, was received by French officials; a 1934-1935 survey of the disputed area by Thai authorities; negotiations held with French authorities in 1925 and in 1937 for the purpose, *inter alia*, of confirming existing borders; and meetings of a Conciliation Commission in Washington in 1947 to discuss boundaries and other matters.

242. The *Island of Palmas Arbitration*¹ provides another example of the twofold requirement of acquiescence that both the assertion of a claim and the alleged tacit acceptance of such claim must be clear and unambiguous. In that case, the arbitrator found that there had been an "open and public" display of authority over the island by the Netherlands, and that no protest against that exercise of territorial rights occurred throughout a period of over 200 years².

SECTION 2. The Official Upon Whose Conduct Claims of Acquiescence and Estoppel are Made Must Have the Authority to Bind the State

243. In its Memorial, Canada touches upon but does not review in substance another requirement of the doctrines of acquiescence and estoppel, namely, that the official whose conduct is at issue must have the authority to bind the State. Canada asserts that, "[i]n the context of official correspondence, the presumption is that each official has the appropriate authority and speaks for the government concerned . . .". There is no such presumption recognized in international law. In order for a State to be bound by the representations of its officials, those officials must have the requisite authority. While that authority may be either express or implied, it cannot be presumed. As one commentator has stated:

"It is, finally, clear that before a party can be bound by a representation the representation must have been made with its authority, express or implied: in the absence of such authority another party would not be entitled to rely upon the statement. Where the authority is expressly given no real difficulty arises, but in cases of implied authority it will be a question of construction of the status of the person actually making the representation and the sphere within which he purports to act with authority: there is a notion of 'apparent' authority which it would seem international tribunals will accept "".

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These latter meetings were characterized by the Court as "an outstanding opportunity for Thailand to claim a rectification of the frontier . . .". *I.C.J. Reports* 1962, p. 28. One other, more positive indication of Thai intentions relied upon by the Court was the production in 1937 of an official Thai map that showed the Temple to be located in Cambodia.

¹ R. Int'l. Arb. Awards (United Nations Series), Vol. II, p. 829.

² *Ibid.*, p. 868.

³ Canadian Memorial, para. 418.

⁴ Bowett, *op. cit.*, p. 192.

244. Canada nonetheless contends that the *Russian Indemnity* case and the *Yukon Lumber* case support its view that there exists in international law a presumption that each official has the authority to speak on behalf of his government¹. Neither case supports the Canadian view.

245. The *Russian Indemnity* case² involved a dispute over the obligation of Turkey under an 1879 treaty to pay interest on war reparations owed to Russia. The treaty provided that claims were to be paid by Turkey after those claims had been examined and presented to the Ottoman Government by the Russian Embassy in Constantinople. In its initial demands for payment, the Russian Embassy made reference to the obligation of Turkey to pay interest on any outstanding balance owing to Russia. The Ottoman Government subsequently made a number of long-delayed payments of principal alone. During this protracted period, the Russian Embassy made repeated demands for payment, but only identified as the outstanding balance amounts that were equivalent to the remaining principal. After Turkey had proffered a final payment of principal, the Russian Government renewed its demand for the payment of interest. An arbitral tribunal was formed to decide the issue. Turkey contended that, throughout some 10 years of correspondence, the Turkish Government and the Russian Embassy had interpreted the term "balance of the indemnity" to refer to the balance of principal alone. Turkey claimed that the Russian Government was bound by this understanding³.

246. The Tribunal held that Russia had renounced its right to interest, as:

"[t]he Imperial Russian Government can not . . . validly reconsider one-sidedly an interpretation accepted and practised in its name by its Embassy"⁴.

The 1879 treaty providing for payment of war reparations expressly authorized the Embassy to act on behalf of the Russian Government in the presentation and payment of claims, and, as the Court noted, this provision was confirmed by the ensuing practice of the Parties under the treaty⁵. The *Russian Indemnity* decision confirms the requirement that officials upon whose conduct a claim of acquiescence and estoppel rests must have the necessary authority to bind the State.

¹ Canadian Memorial, para. 418 and n. 28.

² Hague Ct. Rep. (Scott), 1916, p. 297.

³ *Ibid.*, pp. 320-322.

⁴ *Ibid.*, p. 323.

⁵ *Ibid.*, p. 322.

247. Nor does the award of the British-American Arbitral Tribunal in the *Yukon Lumber* case¹ support Canada's assertion on this point. The issue in that case was whether the British Government, acting on behalf of the Canadian Government, was estopped as the result of the conduct of its Dominion Crown Timber and Land Agent in the Yukon Territory. Although the Agent was a minor official who did not represent the British Foreign Office, the Arbitral Tribunal found that he had been expressly authorized to act with respect to the disposition of timber on behalf of the United Kingdom. The Tribunal, therefore, found that the United Kingdom was bound by the Agent's failure to exercise his responsibilities in the *bona fide* purchase by the United States Government of timber cut in trespass on Canadian territory. The duties and powers of the Agent were defined in a British Order in Council as follows:

"It shall be the duty of the Crown Timber and Land Agent, subject to the authority of the Commissioner, *to receive and regulate all applications for licenses and permits to cut timber for lumbering purposes* and for fuel, for the purchase of coal lands, for the lease of lands for grazing purposes, and for hay permits; also, subject to regulations to be provided in that behalf, to receive and deal with applications for the purchase of land, but no lease or sale of land shall take place except in accordance with the regulations furnished from the Department".

The Tribunal made no presumption on the subject of authority, but instead required explicit confirmation of specific authority to transact the very affairs of the State that were in dispute.

248. These cases establish that where the purported acceptance of a claim is made without legal authority, the objecting State is not bound. The level and area of substantive responsibility of the official involved is important in this regard³. As one commentator has written:

¹ R. Int'l Arb. Awards (United Nations Series), Vol. VI, p. 17.

² *Ibid.*, p. 19. [Emphasis in original.]

³ In the context of a dispute between the state of California and the federal government of the United States concerning offshore oil rights, the Supreme Court of the United States disregarded statements by mid-level federal officials that California owned such rights, as well as actions by the Department of the Interior inconsistent with the federal claim. The Court said: "... officers who have no authority at all to dispose of Government property cannot by their conduct cause the Government to lose its valuable rights by their acquiescence, laches, or failure to act". *United States v. California*, 332 U.S. 19, 40 (1947). Similarly, in an 1822 case involving the location of a boundary between the United States and the British provinces in Passamaquoddy Bay, a United States court rejected evidence of an understanding between British and American customs collectors

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"[I]t seems clear that, at the lower official level, a single statement in one diplomatic note will not be sufficient to bind a state for the future ¹."

249. The case of the *Legal Status of Eastern Greenland* ² illustrates a situation in which sufficient authority was found to establish a binding obligation. In that case, the Norwegian Minister for Foreign Affairs stated explicitly that "the Norwegian Government would not make any difficulties in the settlement of [the Greenland] question". The Court held that the statement constituted an obligation on the part of Norway to refrain from contesting Danish sovereignty over Greenland, declaring:

"The Court considers it beyond all dispute that a reply of this nature given by the Minister for Foreign Affairs on behalf of his Government in response to a request by the diplomatic representative of a foreign Power, in regard to a question falling within his province, is binding upon the country to which the Minister belongs ³."

250. The Court based its conclusion upon the "unconditional and definitive" ⁴ statement of the official directly responsible for the conduct of Norway's foreign relations, made in response to an inquiry, equally direct and explicit, made by Denmark at a similarly high diplomatic level.

251. The case of the *Arbitral Award Made By the King of Spain* ⁵ is of similar effect. There, Nicaragua was held to be bound by a 1906 award by the King of Spain in a territorial dispute between Nicaragua and Honduras ⁶. This estoppel was raised by a series of statements made by the President and Foreign Minister of Nicaragua, in which they explicitly accepted the award as having resolved the dispute between the two States, without expressing any doubts concerning its validity ⁷. As in the *Eastern*

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regarding the location of that boundary. *The Fame*, 8 Fed. Cas. 984, 986 (No. 4,634, 1822). In doing so, the Court said: "As to the line agreed upon by the collectors, it cannot for a moment be admitted as of any validity. They were not public agents intrusted with such negotiations; and their acts are not to be construed as indicating the sense of either government". *Ibid.*, p. 986.

¹ E. Luard, *The International Regulation of Frontier Disputes*, 1970, p. 186. Annex 32, Vol. V.

² P.C.I.J., Series A/B, No. 53, 1933, p. 22.

³ *Ibid.*, p. 71.

⁴ *Ibid.*, p. 72.

⁵ *Case concerning the Arbitral Award made by the King of Spain on 23 December 1906*, I.C.J. Reports 1960, p. 192.

⁶ *Ibid.*, p. 217.

⁷ I.C.J. Reports 1960, pp. 210-213.

Greenland case, the Court based its conclusion upon express, unambiguous statements made by officials who were responsible for the conduct of the foreign relations of the State¹.

SECTION 3. Acquiescence and Estoppel Require Passage of a Substantial Period of Time

252. Another requirement of the doctrines of acquiescence and estoppel, and one essentially overlooked by Canada in its Memorial, pertains to the duration of time that must elapse. The commentators generally agree that the amount of time necessary to establish acquiescence through a purported absence of protest varies with the facts of a given case. Professor MacGibbon states:

"... acquiescence is primarily dependent for its legal effect upon the fact that it is necessarily conjoined with the passage of time ...".

He also states that the requisite length of that passage:

"... will depend on the intensity with which the claim is manifested; on the publicity surrounding its promulgation or enforcement; on the nature of the right claimed; on the position and condition of the territory affected; and so on ...".

253. Similarly, Professor Giuseppe Sperduti states that the type of claim asserted is the primary circumstance to be weighed in evaluating

¹ The Canadian Memorial, at para. 415, cites this case as an example of a decision that is based upon the principle of acceptance or recognition by conduct. The Canadian Memorial does not discuss, however, the nature of the case and the extraordinary character of the conduct at issue. In response to a Honduran plea that the Court declare a 1906 arbitral award valid and binding, Nicaragua contended, *inter alia*, that the award was a nullity because of technical irregularities in the appointment of the King of Spain as sole arbitrator. After finding no merit in the purported irregularities, the Court stated that, in view of Nicaragua's agreement to the King's appointment and its failure to raise any objection during its full participation in the arbitral proceedings, it could not then question technical irregularities in the appointment, even if they had existed. With respect to additional Nicaraguan challenges to the substance of the award, the Court noted that, after the issuance of the award, Nicaragua, through express declarations and conduct on the part of its President, Foreign Minister, and National Legislative Assembly, had recognized the award as valid, and had raised no objection to its substance. By such conduct, the Court found Nicaragua to be foreclosed from challenging the award's validity and from raising before the Court the objections it had raised to the substance of the award. Moreover, the Court found Nicaragua's substantive objections to be without merit.

² MacGibbon, *op. cit.*, p. 165.

the duration of an attitude of acquiescence¹. In this regard, Professor Sperduti adds that the exercise of a right that is itself to be one of long duration, such as the right of territorial sovereignty, will normally require a much longer period than would a one-time violation of a subjective right, such as an unlawful expropriation of property¹.

254. There is also substantial agreement that acquiescence through an absence of protest requires the passage of a substantial period of time. In an oft-quoted passage, Oppenheim has described this requirement as involving:

"... such a period as is necessary to create under the influence of historical development the general conviction that the present condition of things is in conformity with international order".

Professor O'Connell suggests simply that acquiescence based upon tacit acceptance requires the passage of a long period of time³.

255. Nevertheless, Canada suggests that a failure to protest "*even in the short run*" is sufficient to establish acquiescence⁴. Canada apparently professes to base its view upon the *Anglo-Norwegian Fisheries* case and the *Temple of Preah Vihear* case, discussed above. In fact, these and other cases involving tacit acceptance of territorial claims demonstrate that the Canadian reliance is misplaced.

256. In the *Anglo-Norwegian Fisheries* case, the Court found that the United Kingdom had acquiesced in Norway's claim to a straight-baseline system on the basis of a "prolonged abstention" from protest against the clear and notorious Norwegian claims—specifically, an abstention that had endured for over 60 years⁵. In the *Temple of Preah Vihear* case, the Court found that there had been acquiescence on the part of Thailand in the boundary claimed by Cambodia as a result of the repeated failure of Thai officials to protest the Cambodian claim over a period of more than 50 years⁶. Other cases in which acquiescence has been found involve similarly protracted periods of time during which there was a failure by a State to protest a claim or otherwise to preserve its rights. For instance, the *Island of Palmas Arbitration* involved an exercise of sovereignty by

¹ G. Sperduti, "Prescrizione, consuetudine e acquiescenza in diritto internazionale", in *Rivista di diritto internazionale*, 1961. [Unofficial translation.] Annex 33, Vol. V.

² L. Oppenheim, *I International Law* (8th ed. Lauterpacht), 1955, p. 576. [Emphasis in original.]

³ D. O'Connell, *I International Law*, 1970, pp. 424-426.

⁴ Canadian Memorial, para. 414. [Emphasis in original.]

⁵ *I.C.J. Reports 1951*, pp. 138-139.

⁶ *I.C.J. Reports 1962*, p. 29.

the Netherlands that was uncontested for a period of over 200 years¹. In the *Alaskan Boundary Dispute*, Russia, and successively the United States, occupied and governed the territory in dispute without protest or objection for more than 60 years². Finally, in the *Minquiers and Ecrehos* case, also cited by Canada, the Court determined that certain acts by France with respect to the islets in dispute, over the course of some 60 years, were not sufficient evidence of the intention of France to act as sovereign over those islets³.

257. In these cases, involving claims to sovereignty over territory or to jurisdiction over maritime areas, the lapse of time during which silence or lack of protest was found to constitute acceptance was protracted, sometimes 50 years, and often considerably more. These cases suggest that silence or lack of protest for a comparatively short time is insufficient to establish acquiescence, because there may be explanations for such silence other than acceptance of the claim. For example, a State may consider it advisable to defer any protest in order to prepare for amicable negotiations or other peaceful means of settlement. It would be contrary to the furtherance of peaceful international relations to conclude from a purported temporary silence that the drastic consequences of acquiescence and estoppel should result.

SECTION 4. The Party Asserting Estoppel Must Have Suffered Detriment Resulting From Reasonable Reliance Upon the Purported Acquiescence

258. Canada argues that estoppel "is an *alter ego* of acquiescence", with acquiescence itself operating as an estoppel against a later denial of the acceptance of a claim. Canada also contends that estoppel, as "a separate rule of law with precise criteria", requires that the State

¹ R. Int'l Arb. Awards (United Nations Series), Vol. II, p. 869.

² *Views of the United States Commission on the Alaskan Boundary, as defined by the Treaty of 1825, 1898*, pp. 16-17.

³ *The Minquiers and Ecrehos case, I.C.J. Reports 1953*, p. 47.

⁴ Canadian Memorial, para. 420. [Emphasis in original.]

⁵ Canadian Memorial, para. 423. The discussion of estoppel in the Canadian Memorial suggests a sharp distinction between the doctrines of acquiescence and estoppel, one that does not appear in the cases. Indeed, as Canada acknowledges, the doctrine of estoppel in international law is still a developing one. Canadian Memorial, para. 424. Acquiescence is an essential element of estoppel, and there is a close relationship between the two concepts. As Judge Alfaro stated in the passage from the *Temple of Preah Vihear* case quoted by Canada (Canadian Memorial, para. 420, n. 29): "The principle, not infrequently called a doctrine, has been referred to by the terms of 'estoppel', 'preclusion', 'forclusion', 'acquiescence' ". *I.C.J. Reports 1962*, p. 39.

seeking to invoke the doctrine must have relied upon the silence or inaction of the other State, either to its own detriment or to the advantage of the other State¹.

259. In the *Temple of Preah Vihear* case, upon which Canada relies, Cambodia argued that Thailand had accepted the depiction on a map of their boundary as claimed by Cambodia, and thus, in effect, that Thailand was estopped from contesting Cambodia's sovereignty over the area in dispute². Both Thailand and Cambodia had long conducted their mutual relations in accordance with the boundary claimed by Cambodia, which was depicted on a map prepared jointly by the two States. The Court ruled in favor of Cambodia, based in part upon the benefits that Thailand was found to have received from a stable frontier for more than 50 years under the terms of that map³. Thus, this case is an illustration of detrimental reliance arising as a result of some concrete and long-standing benefit accruing to the State against which acquiescence and estoppel are asserted.

260. Whenever detriment or benefit is alleged, it is recognized that any finding must rest upon the principle of good faith.

"There must be reliance in good faith upon the statement either to the detriment of the party so relying on the statement or to the advantage of the party making the statement".

The State claiming estoppel, therefore, is not free to attach whatever meaning it chooses to the conduct of the other and to proceed accordingly. Its reliance must have been reasonable under the circumstances. A determination of what constitutes reasonable reliance, as with the determination of whether a claim has been asserted and accepted, can only be made with reference to all relevant conduct of the Parties. The International Court of Justice in the *North Sea Continental Shelf* cases described the conduct necessary to invoke an estoppel as follows:

"... past conduct, declarations, etc., which not only clearly and consistently evinced acceptance of that régime, but also had caused Denmark or the Netherlands, in reliance on such conduct, detrimentally to change position or suffer some prejudice".

261. As will be shown in Part III, the facts set forth in Part I do not satisfy the requirements of the doctrines of acquiescence and estoppel set forth in this Part.

¹ Canadian Memorial, para. 423.

² *I.C.J. Reports* 1962, p. 11.

³ *Ibid.*, p. 32.

⁴ Bowett, *op. cit.*, p. 202.

⁵ *I.C.J. Reports* 1969, p. 26, para. 30.

PART III. APPLICATION OF THE LAW TO THE FACTS

INTRODUCTION

262. As set forth in Part II above, the Parties are agreed in principle concerning the Fundamental Rule that the single maritime boundary between the United States and Canada in the Gulf of Maine area must be delimited in accordance with equitable principles, taking account of the relevant circumstances in the area, to produce an equitable solution. The Parties disagree, however, with regard to both the principles that are applicable, and the circumstances that are generally relevant, to such a delimitation. In Part I of this Counter-Memorial, the United States has set forth the basis for its disagreement with Canada concerning a number of facts, and has affirmed its assertion of certain facts not addressed by Canada.

263. In Part III, the United States demonstrates that there is no merit to Canada's assertion that the objection of the United States to Canada's "use of the equidistance method in the Gulf of Maine area and the exercise of Canadian jurisdiction on Georges Bank"¹ is barred by the doctrines of acquiescence and estoppel.

264. The United States then identifies and discusses other areas where *Canada specifically misapplies the law to the facts*. The United States also affirms its position that, under a correct application of the law to the facts, the maritime boundary proposed by the United States produces an equitable solution, while the Canadian line would not.

¹ Canadian Memorial, para. 428.

CHAPTER I

THE UNITED STATES IS NOT BARRED FROM CONTESTING CANADIAN CLAIMS TO JURISDICTION OVER A PORTION OF GEORGES BANK BY THE DOCTRINES OF ACQUIESCENCE AND ESTOPPEL

265. Canada argues that, by virtue of alleged conduct in regard to continental shelf exploration permits issued by Canada in the mid-1960s, the United States has acquiesced in "the use of the equidistance method in the Gulf of Maine area and the exercise of Canadian jurisdiction on Georges Bank¹". Canada argues further that this alleged conduct has created an estoppel in favor of Canada, the effect of which is to require that the single maritime boundary to be delimited in the area "should be compatible with the rights which have vested in Canada¹".

266. There are seven reasons why the conduct of the United States during the relevant period does not constitute either express or tacit consent to an equidistance boundary in the Gulf of Maine area. As a result, United States objections to such a boundary are not barred.

267. First, Canada did not during the relevant period clearly and unambiguously assert a claim in which the United States could have acquiesced. Second, the letters of L.T. Hoffman, of the United States Department of the Interior, on their face do not amount to a consent by the United States to any alleged Canadian claim and, in fact, call any such Canadian position into question. Third, Mr. Hoffman was not authorized to speak on behalf of or to bind the United States Government. Fourth, the conduct of the United States Government before and during the relevant period was inconsistent with any express or tacit consent to an equidistance boundary in the area. Fifth, the alleged episode took place over a brief period of time, far less than that required to establish tacit consent. Sixth, Canada had no reasonable basis for relying upon any purported acceptance by the United States, and, in fact, Canada did not so rely to its detriment. Finally, the Canadian claim of acquiescence is based entirely upon activities relating to the continental shelf and ignores the fisheries dimension of this case.

¹ Canadian Memorial, para. 428.

268. The 1965 exchange of correspondence upon which Canada bases its claim of acquiescence was not initiated by Canada. Mr. Hoffman, the Assistant Director of the Land and Minerals Division of the Bureau of Land Management of the United States Department of the Interior, wrote a letter to the Canadian Department of Northern Affairs and National Resources, in which he requested information concerning the issuance of Canadian oil and gas "permits" on the outer continental shelf¹. Mr. A. D. Hunt, Chief of the Resources Division of that Department, replied to this inquiry, indicating that permits had been issued up to an equidistant line drawn across Georges Bank². Mr. Hoffman responded, disclaiming in his letter any negotiating authority and inquiring in more detail concerning the Canadian permits. He also protested that Canada may have issued permits in an area subject to United States jurisdiction¹.

SECTION 1. Canada Did Not Assert Clearly and Unambiguously a Maritime Boundary Claim in the Gulf of Maine Area in Which the United States Could Acquiesce

269. In order to establish acquiescence on the part of the United States, Canada must first establish that it clearly and unambiguously asserted a boundary claim in the Gulf of Maine area. Canada apparently maintains that the letter from the Department of Northern Affairs and National Resources to Mr. Hoffman, which was in response to inquiries initiated by Mr. Hoffman, constitutes such a claim that is opposable against the United States.

270. The Canadian Government has long been aware of, and normally insists upon, the standard practice whereby the embassies of the United States and Canada, and the Department of State and the Department of External Affairs, are the respective agents of the two governments through which messages of a diplomatic character are dispatched and received. Indeed, the United States and Canada followed this practice both prior to, and during, the relevant period with regard to other matters

¹ Letter of 1 April 1965 to Department of Northern Affairs and Natural Resources, Resources Division, Northern Branch, from L. T. Hoffman. *Reprinted at United States Memorial, Annex 53, Vol. IV.*

² *Reprinted at United States Memorial, Annex 53, Vol. IV.*

involving the maritime jurisdiction of the Parties, including claims to exclusive-fishing zones¹.

271. The letter from the Canadian Department of Northern Affairs and Natural Resources in no wise reflects the clear and unambiguous conduct of a sovereign State that is required under international law to constitute a claim sufficient to invoke the doctrines of acquiescence and estoppel. Moreover, the letter lacks the required notoriety. Unlike the decrees issued by the Government of Norway that are discussed in the *Anglo-Norwegian Fisheries* case², and the acts of similar notoriety described in the *Eastern Greenland*³ and *Temple of Preah Vihear* cases⁴, the letter relied upon by Canada as constituting a boundary claim was from a mid-level government official in a Canadian agency having no responsibility for legislative or foreign-policy matters.

272. Canada issued no proclamation or other public notice that might have informed the United States of a purported claim by Canada in this area. Canada relies instead upon its own unilateral action in the issuance of permits. As the Canadian Department of Energy, Mines and Resources recently stated, however:

“The fact that Canada has issued permits covering extensive offshore areas does not, by itself, maintain the nation’s jurisdic-

¹ For example, in 1945, the United States communicated to Canada by diplomatic note the Truman Proclamations relating to the continental shelf and to conservation of the fisheries of the high seas. United States Memorial, Annex 3, Vol. I. During the relevant period, the United States formally informed Canada of the establishment of the United States 12-nautical-mile contiguous fishing zone, effective 14 October 1966. Note from Department of State to Embassy of Canada, 29 November 1966. Annex 34, Vol. V. During the period, the United States was also informed by diplomatic note of the intention of the Government of Canada to establish a straight-baseline system. Note-Verbale from the Department of External Affairs to the Embassy of the United States, 25 October 1967; Note from the Department of State to Embassy of Canada, 1 November 1967; and Aide-Memoire from the Embassy of Canada to the Department of State of 11 November 1967. Annex 34, Vol. V. The United States and Canada have followed similar formal notification practices with respect of the extension of the Canadian territorial sea to 12 nautical miles in 1970; the enactment of Canadian legislation affecting the waters of the Arctic in 1970; and the enactment by the United States on 18 January 1974 of a law declaring the American lobster a creature of the continental shelf (see United States Memorial, para. 144, Figure 16, and Annex 59, Vol. IV).

² *I.C.J. Reports* 1951, p. 116.

³ *P.C.I.J., Series A/B, No. 53*, 1933, p. 22.

⁴ *I.C.J. Reports* 1962, p. 6.

tional claims to the seabed resources of these areas. Unilateral action by a State does not in itself create or even necessarily lead to international law. It is the acceptance of this practice and the adoption of similar practices by other States that normally leads to the formulation of international law¹."

273. In the *Tunisia/Libya* case, the International Court of Justice found that domestic legislation and a regulation specifically addressing the continental shelf were insufficient to constitute a unilateral claim for a maritime boundary. This finding was made where the law and regulation in question were accompanied by maps that depicted a line. As the Court concluded:

"Both the Law and the Regulation which followed it are purely internal legislative acts, intended to identify domestic zones for the petroleum exploration and exploitation activities of Libya, and could, in view of the admission by Libya itself during the oral proceedings that the Law does not purport to be an 'act of delimitation', hardly be considered even as a unilateral claim for maritime lateral boundaries with Tunisia. Moreover, paragraph 1 of Article 4 of the Law refers to the 'seabed and subsoil which lie beneath the territorial waters and the high seas contiguous thereto under the control and jurisdiction' of Libya; there is no evidence that Libya had claimed control and jurisdiction over a contiguous zone of about 50 nautical miles beyond the territorial sea prior to the time the Law was enacted. . . . There is no doubt that Libya in 1955, by enacting the Petroleum Law and Petroleum Regulation No. 1, purported to claim sovereign rights over shelf resources; but the mere indication on the map of the line in question is not sufficient even for the mere purpose of defining a formal claim at the level of international relations to a maritime or continental shelf boundary. For these reasons the Court finds that the line referred to by the Libyan Legislation of 1955 is not opposable to Tunisia, that the ZV 45° line is not opposable to Libya and that neither can be taken into consideration for the purposes of this Judgment²."

If the Libyan law and regulation did not constitute an "act of delimitation", then, *a fortiori*, the laws and regulations pursuant to which the

¹ *Surveying Offshore Canada Lands for Mineral Resources Development*, Surveys and Mapping Branch, Canadian Dept. of Energy, Mines and Resources, 2nd ed., Oct. 1975, p. 8, at Annex 39, Vol V.

² *I.C.J. Reports* 1982, p. 69, para. 92.

Canadian permits were issued do not. Those Canadian laws and regulations, on their face, did not specifically apply to maritime areas at all and were not accompanied by any pertinent map¹.

SECTION 2. Mr. Hoffman, a United States Government Employee, Did Not Acquiesce in any Purported Canadian Claim

274. As noted at paragraph 136 of the United States Memorial and at paragraphs 110 through 112 of this Counter-Memorial, Mr. Hoffman's letters placed Canada on notice that the exploration permits it had issued appeared to cover areas of the United States continental shelf. Mr. Hoffman wrote:

"As a matter of some concern to us, we believe that you have issued offshore permits on the Outer Continental Shelf pertaining to the United States. We believe this is the case in the Gulf of Maine. . . ."

275. Moreover, Mr. Hoffman indicated that the United States had issued seismic exploration permits covering the continental shelf off the east coast of the United States. Mr. Hoffman's conduct thus was inconsistent with, and constituted a protest against, any claim that Canada might be deemed to have made.

SECTION 3. Mr. Hoffman Lacked the Authority to Consent to any Purported Canadian Claim

276. Another required element of acquiescence is the authority of the official whose conduct is in issue to speak for, and to bind, his government. Mr. Hoffman clearly had no express authority with regard to international-boundary matters. Moreover, Mr. Hoffman made clear in his letter of 14 May 1965 that he had no express or implied authority in that regard.

277. Even if Mr. Hoffman had not made an express disclaimer of authority to bind the United States, there would be no basis in the circumstances of this case for inferring any such authority. As Canada is well aware, the Department of the Interior does not represent the United States in the conduct of foreign relations. Furthermore, there is the position occupied by Mr. Hoffman within that Department. As Assistant Director for Land and Minerals, of the Bureau of Land Management of the United States Department of Interior, Mr. Hoffman was but one of three assistant directors in one bureau of that Department. Superior to the assistant directors were the Deputy Director and the Director of the Bureau of Land Management. The Director was responsible to the

¹ See para. 108, n. 3, *supra*.

² United States Memorial, Annex 53, Vol. IV. [Emphasis added.]

Deputy Assistant Secretary for Lands and Resources, who, in turn, was responsible to the Assistant Secretary. The Assistant Secretary was responsible to the Undersecretary, who in turn reported to the Secretary of the Interior. Neither the Department for which Mr. Hoffman worked nor anyone in Mr. Hoffman's position had the authority that Canada would have the Court believe.

278. As Part II, Chapter IV, has shown, it would be unprecedented in the law if Mr. Hoffman's letters were characterized as representing the acquiescence of a sovereign State in a purported boundary claim. There is no evidence of authorized conduct by any United States officials in this case that approaches that which is required to constitute acquiescence, such as was found to have occurred in the case of the *Legal Status of Eastern Greenland* and other cases¹.

SECTION 4. The Conduct of the United States Both Before and During the Relevant Period Was Inconsistent with Consent to any Purported Canadian Claim

279. Canada has been on notice since 1945 that the boundary in the Gulf of Maine area was, in the view of the United States, to be established by agreement of the two States and in accordance with equitable principles. Canada has never objected to that position.

280. In addition to ignoring the Truman Proclamation, the text of Mr. Hoffman's correspondence, and his obvious lack of authority, Canada ignores the systematic United States exploration of the continental shelf off New England beginning in 1964. The first permit covering the northeastern portion of Georges Bank was issued at about the same time as the initial letter from Mr. Hoffman was written². Additional permits covering Georges Bank were issued throughout the ensuing five-year period within which Canada seeks to establish acquiescence. To date, under twenty-five permits issued since 1965³, the United States has conducted over 20,000 nautical miles of seismic survey lines on the northeastern portion of Georges Bank alone.

SECTION 5. The United States Made Timely Protest of any Purported Canadian Claim

281. In order to establish acquiescence in any purported boundary claim, Canada must show a failure to protest that claim over a long period

¹ See Part II, Chapter IV.

² See List of Permits, accompanying the letter of 20 January 1983 from Davis R. Robinson, Agent of the United States, to Mr. Santiago Torres Bernárdez, Registrar of the International Court of Justice; Annex 15, Vol. V. Additional permits covering the entirety of Georges Bank were issued throughout the period in question.

³ Annex 26, Vol. V.

of time. Canada cannot do so, because, in addition to Mr. Hoffman's expressions of concern, the United States promptly reserved its position.

282. The first official notification to the United States of a Canadian position with regard to its permit program occurred through diplomatic channels in a letter dated 30 August 1966¹. In that letter, a Canadian official replied on behalf of the Under Secretary for External Affairs of Canada to an inquiry from the United States Embassy. This inquiry, dated 16 August 1966², requested information concerning Canada's offshore oil and gas program, particularly in regard to operational plans and schedules of permit holders. The Canadian letter of 30 August 1966 was not responsive to the United States inquiry. To this day, the United States is not aware of any activities on Georges Bank by the Canadian permit holders.

283. On 10 May 1968, the United States called for a moratorium on all United States and Canadian oil and gas activities on Georges Bank until after the boundary in that area had been settled³. The Canadian Memorial attempts to characterize the United States aide-memoire of 10 May 1968 as having failed to establish a legal dispute between Canada and the United States. The United States disagrees. The United States aide-memoire both called for a moratorium on continental shelf activities on Georges Bank and requested consultations with Canada. The aide-memoire was a formal, written communication to Canada transmitted through appropriate channels. This communication placed Canada on notice that the United States formally took issue with any Canadian permits on Georges Bank, as had Mr. Hoffman's informal correspondence that preceded it.

284. Only three years passed from Mr. Hoffman's initial letter in May of 1965 to the United States aide-memoire in May of 1968. Only 21 months passed from the time the matter entered diplomatic channels, in August of 1966, to this formal United States protest³. At no time during this period did Canada assert a formal boundary claim specifying geographic coordinates. This period is to be compared to the 60 years that passed in the *Anglo-Norwegian Fisheries case*⁴ so heavily relied upon by

¹ United States Memorial, Annex 54, Vol. IV.

² United States Memorial, Annex 55, Vol. IV.

³ In relation to the timing of these events, one factor should be noted. Because of the tradition of friendship and cooperation between the United States and Canada, there is a reluctance to escalate immediately all differences to the diplomatic level. The inclination is to seek information, to consult, and to reach a reasonable accommodation. Notes of protest routinely would follow only upon a series of discussions that were unable to bridge the differences.

⁴ *I.C.J. Reports 1951*, pp. 138-139.

Canada, and to the similar or even longer periods found in the other cases cited in the Canadian Memorial.

SECTION 6. Canada Did Not Rely to its Detriment Upon Any Action or Inaction of the United States

285. Having failed to establish acquiescence on the part of the United States, Canada must perforce fail to establish an estoppel. Canada nonetheless searches in vain in its Memorial for the reliance that is necessary to raise the bar of estoppel. In attempting to do so, Canada constructs a position that is contradictory on its face. Canada first argues in its Memorial that it acted to create legal relationships in reliance upon the purported acquiescence of the United States in an equidistance boundary in the Gulf of Maine area¹. Virtually all of the Canadian oil and gas permits on Georges Bank, however, were issued before Mr. Hoffman initiated his correspondence. It was not, therefore, the action, or inaction, of the United States that precipitated the conduct that Canada seeks to construe as evidence of its reliance. Canada issued its permits without notification to or consultation with the United States. There is thus no basis for Canada's assertion that "the Canadian Government for a substantial period was placed in the position of assuming a rightful power to create legal relationships with Canadian and foreign persons and corporations by the grant of permits"².

286. Canada next proceeds to argue that it suffered detriment because it was placed in a position of "disarmament" as a result of the alleged acceptance of the equidistant or median line by the United States³. Canada contends that, to protect its legal position, it took only those positive and public steps that were appropriate in the absence of any protest by the United States to its purported claim⁴. During 1967 and 1968, the United States collected 2,219 miles of seismic survey data in the northeastern portion of the Bank⁴. These actions were, of course, the routine exercise by the United States of jurisdiction over its continental shelf. Canada, in fact, was aware of this exploration program from the Hoffman correspondence. Thus, in spite of the obvious effect such activities have upon the

¹ Canadian Memorial, para. 424.

² Canadian Memorial, para. 426.

³ Canadian Memorial, paras. 425 and 426.

⁴ Annex 26, Vol. V.

Canadian claim of "disarmament", the actions of Canada did not differ significantly after it knew of these United States exploration activities".

SECTION 7. Canada's Claim of Acquiescence Ignores the Fisheries and Other Dimensions of this Case

287. As the International Court of Justice concluded in the *Tunisia/Libya* case, all facets of the relations between States must be evaluated to determine whether a line declared unilaterally by one State is opposable against the other². Canada's contentions regarding acquiescence and estoppel ignore the other dimensions of this dispute, as, for example, the fact that neither Canada nor the United States has ever used the equidistance method to delimit a boundary for any other purpose in this area, such as defense interests, or search and rescue operations³. In particular, Canada's contentions ignore the long history of United States fishing on Georges Bank, notwithstanding the fact that Canada regards the fisheries as a crucial part of this case. The inclusion of fisheries has, in Canada's words, "expanded and transformed" the nature of this case to something other than a continental shelf controversy⁴. The Canadian position concerning the purported role of the doctrines of acquiescence and estoppel, in its ignorance of these other dimensions, particularly that of fishing, is contrary to fact, law, and history.

SECTION 8. Conclusion

288. In conclusion, as a matter of both law and fact, the United States has not acquiesced in the issuance by Canada of oil and gas permits on Georges Bank or in any Canadian line or method. Accordingly, the United States is not estopped from advancing its boundary claim in this case.

¹ Canada's assertion that it was disarmed by the purported acquiescence of the United States in an equidistance boundary is curious. Canada seeks to use the Hoffman correspondence to establish acquiescence, while that very correspondence puts Canada on notice of the United States permit program. Even if Canada suffered any detriment, which the United States denies, it would be insufficient to support estoppel. In order to support estoppel, any reliance must be reasonable. As discussed above, Canada was unjustified in relying in any fashion upon the correspondence between mid-level officials of departments of the two governments having no responsibilities whatsoever concerning international boundaries.

² *I.C.J. Reports 1982*, pp. 66-68, paras. 86-90.

³ See Part I, Chapter VI, *supra*.

⁴ Canadian Memorial, para. 223.

CHAPTER II

THE ADJUSTED PERPENDICULAR LINE PROPOSED BY THE UNITED STATES PRODUCES AN EQUITABLE SOLUTION, WHILE THE CANADIAN LINE WOULD NOT

289. In Chapter III of Part III of the United States Memorial, at paragraphs 305 through 331, the United States demonstrated that the adjusted perpendicular line that it proposes produces an equitable solution, while an equidistant line would not. An equidistant line would not respect the coastal fronts of the Parties; would produce a disproportionate delimitation; would not take into account the Northeast Channel; would not facilitate conservation and management of the resources of the area or minimize the potential for disputes; and would ignore a number of other relevant circumstances. Canada has not proposed an equidistant line, but an equidistant line modified in its favor. Any delimitation allocating to Canada a larger area than an equidistant line is not, *a fortiori*, in accordance with equitable principles, and, therefore, would not produce an equitable solution.

CHAPTER III

THE CANADIAN LINE IS BASED UPON A NUMBER OF MISAPPLICATIONS OF THE LAW TO THE FACTS

290. Canada seeks to support the line it proposes by specific misapplications of the law to the facts. Canada ignores the central significance to this case of the location of the international land boundary in the far northern corner of the Gulf of Maine. Canada also ignores the primary coastal front of the United States extending from the states of Maine and New Hampshire, as well as from Massachusetts. The Canadian line does not produce an equitable solution when tested on the basis of proportionality. Canada fails to take account of such highly relevant circumstances as the Northeast Channel (which constitutes the only natural boundary in the relevant area) and the predominant interest of the United States, in particular the interest resulting from the development and long usage by the United States of the fisheries of Georges Bank and the Gulf of Maine Basin. In its Memorial, Canada fails to recognize the equitable principles of conservation and management of resources and dispute minimization, and relies instead upon the rejected notions of economic dependence and relative wealth. Finally, Canada disregards State practice in similar geographical situations.

SECTION 1. The Canadian Line Would Not Take Into Account the Location of the International Land Boundary

291. Canada's line does not take into account the location of the land boundary between the Parties within a deep coastal concavity, in the far northern corner of the Gulf of Maine. In so doing, Canada's line ignores the political history of the two States. The Canadian line also attempts to refashion nature, and to repudiate the fundamental principle that the land dominates the sea.

292. The land boundary between the United States and Canada meets the sea in the far northern corner of the Gulf of Maine. Thus, the coastline at the back of the Gulf, comprising the coasts of Maine and New Hampshire, is part of the United States, and the maritime areas in front of these coasts appertain to the United States. The adjusted perpendicular line proposed by the United States respects the location of the land boundary by taking into account the seaward extension of the coastal front of Maine and New Hampshire, while leaving unimpeded the seaward extension of the primary coastal front of Canada into the Atlantic Ocean. Canada's line disregards the fact that the land boundary is located in the corner of the concavity and that the Atlantic-facing coast in the back of the Gulf of Maine is part of the United States. The

concavity causes the Canadian line to be pulled across the front of that coast, almost as far south as the latitude of Philadelphia, Pennsylvania¹.

293. The failure of a method of delimitation to take account of the location of the land boundary is demonstrated hypothetically by placing the international boundary at various points along the coast. One might expect that, as the international boundary is hypothetically moved, an appropriate delimitation method would produce a corresponding movement in the proposed maritime boundary. That would be the case with a perpendicular to the general direction of the coast at the international boundary terminus. That is not the case, however, with the equidistance method.

294. When the equidistance method is used in a deep coastal concavity such as the Gulf of Maine, the equidistant line remains inequitably in the same location in the seaward area outside of the concavity, regardless of where the international boundary terminus is located within the concavity. The equidistant line seaward of the deep concavity is basically a line perpendicular to the closing line across the mouth of the concavity measured from the midpoint of that closing line. This fact is demonstrated at Figure 21. As such, the equidistance method produces an inequitable result by affording no recognition to the location of the land frontier between the two neighboring States.

295. As Figure 22 shows, if the land boundary met the coast at Penobscot Bay, Maine or at Boston, Massachusetts, the equidistant line still would cross Georges Bank at approximately the same location and on the same course as it does when the international boundary is located where it is in fact situated. Moving the hypothetical boundary even farther south, or north, produces the same result. It does not matter, for purposes of an equidistant line outside the Gulf of Maine, if the international boundary terminus is on Cape Cod or on the Nova Scotia peninsula. Any such result, as proposed by Canada, is contrary to the *Fundamental Rule for delimitation jointly recognized by the Parties*.

SECTION 2. The Canadian Line Would Cut Off the Extension of the Primary Coastal Front of the United States Seaward of Maine and New Hampshire

296. Canada's line is based upon the erroneous position that the primary coastal front of the United States at Maine and New Hampshire, as well as that at Massachusetts, is not entitled to its seaward extension both in the interior and in the exterior of the Gulf of Maine area. In this regard, Canada suggests that, under its "equitable equidistance" method, the coastal front of the United States at Maine and New Hampshire has

¹ Figure 33 of the United States Memorial shows the parallel of latitude reached by a 200-nautical-mile equidistant line. See United States Memorial, para. 311.

been used in determining the equidistant line in the interior area and so is entitled to no seaward extension ¹.

297. If the equidistant line in the exterior area is to be determined by coasts that are not used in its determination in the interior area, such a consideration must then be applied equally to both Parties. Under an equidistant line in the interior of the Gulf of Maine area, the whole Canadian southwestern-facing coast of Nova Scotia is used up before the exterior area is reached. Indeed, Canada's basepoints on and around Seal Island control approximately one-half the equidistant line in the interior ². If, pursuant to Canada's theory, the coast of Maine and New Hampshire has been used up in the interior, then so has the southwestern-facing coast of Nova Scotia. Thus, under Canada's own concept, there would be no Canadian coast left for measuring an equidistant line in the exterior of the Gulf of Maine area ³. Such an analysis only demonstrates the inherent weaknesses of the application of the equidistance method in a deep coastal concavity, particularly where the international boundary terminus is located in the corner of that concavity near a protruding coastline such as that of the southwestern-facing coast of Nova Scotia.

298. The equidistance method in this case is inapplicable, because it gives no effect to the seaward extension of the primary coastal front of the United States into and under the sea, thereby disregarding the fundamental principle that the land dominates the sea. The Maine and New Hampshire coasts, while deeply indented and cut into, are aligned in the general southwest-to-northeast direction of the North American coast. They are entitled to their extension seaward to the limits of coastal-State jurisdiction. Figure 31 of the United States Memorial, reproduced here as ⁽³⁷⁾ Figure 23, demonstrates the seaward extension of this coastline. That figure confirms that it is these coasts that face Georges Bank seaward of the Gulf of Maine, and not *any* part of Canada's coast ⁴.

299. Canada further ignores the principle that the land dominates the sea in its unprecedented contention that "geography in its socio-economic as well as its physical aspects should properly have a bearing on the identification and treatment of the coastal areas ... ⁵". Thus, contrary to the principles of law set forth in Part II, Canada argues that coastal areas

¹ Canadian Memorial, paras. 340 and 353.

⁽¹⁵⁾ ² Canadian Memorial, Figure 32.

³ Canada's theory should only be applied, if at all, in regard to the southwestern-facing coast of Nova Scotia, since that coast only *faces upon* the interior of the Gulf of Maine, and not upon the seaward area, as do the coasts of Maine and New Hampshire.

⁴ Even a perpendicular to the unreasonable 67-degree trend line suggested by Canada, measured from the starting point specified in Article II of the Special Agreement, places virtually all of Georges Bank off the United States coast, not off the Canadian coast. See Annex 12, Volume V.

⁵ Canadian Memorial, para. 369.

that do not depend economically upon an offshore area may be ignored in delimitation¹. As demonstrated in Part II, there is no basis for Canada's position, which attempts to refashion nature through the consideration of purported economic dependence and relative wealth in disregard of the principle that the land dominates the sea.

300. Moreover, the notion of proximity cannot be used to negate the principle that the land dominates the sea. In the *North Sea Continental Shelf* cases, the Court rejected the thesis that either the greater distance from the concave coast of the Federal Republic of Germany to the maritime areas in dispute, or the closer proximity of those areas to "lateral wings" represented by the Danish and Dutch coasts, should constitute valid reasons for depriving the concave German coast of the maritime areas before its coastal front. While the *North Sea Continental Shelf* cases concerned the delimitation among three States, the Court's reasoning pertains as well to this case between two neighboring States in a deep coastal concavity. As the Court stated:

"More fundamental than the notion of proximity appears to be the principle—constantly relied upon by all the Parties—of the natural prolongation *or continuation* of the land territory or domain, or land sovereignty of the coastal State, into and under the high seas. . . . There are various ways of formulating this principle, but the underlying idea, namely of an *extension* of something already possessed, is the same, and it is this idea of *extension* which is, in the Court's opinion, determinant²."

The seaward extension of the primary coastal front of the United States along Maine and New Hampshire cannot be erased from the map by any alleged proximity of a secondary coastal front of Canada that does not face Georges Bank.

301. Canada's primary coastal front, which faces the Atlantic Ocean northeast of Cape Sable, is fully respected without any encroachment by the adjusted perpendicular line proposed by the United States. On the contrary, the Canadian line "cuts off" the United States coast at Maine and New Hampshire, as well as that at Massachusetts, from its natural extension, contrary to the basic tenets of the law. Canada's line gives exaggerated and inequitable effect to a short section of Nova Scotia coastline that: (a) is aberrant to the general geographical relationship between the Parties, because it lies perpendicular to the general direction of the coast, and (b) is south of the international boundary terminus.

¹ The United States has shown that fishermen from Maine and New Hampshire have in the past fished, and do at present fish, on Georges Bank and in the Gulf of Maine Basin. Thus, no question of a lack of economic connection can arise in any event.

² *North Sea Continental Shelf* cases, p. 31, para. 43. [Emphasis added.]

302. In conclusion, the effect of applying the equidistance method in this case, either to the actual coastline or the hypothetical one that Canada uses, ignores the location of the international land boundary between the Parties, and disregards the primary coastal front of the United States in favor of one short, secondary coastal front of Canada that is aberrant to the general direction of the coast. Any such result is a misapplication of the law to the facts in this case.

SECTION 3. The Canadian Line Would Not Result in a Proportional Delimitation

303. A boundary line that respects the broad geographical relationship between the coasts of the Parties and the relevant areas in front of those coasts must bring about a reasonable degree of proportionality between the respective lengths of those coasts and the area to be delimited¹. At paragraphs 312 through 314 and Figure 34 of its Memorial, the United States tested the proportionality of the adjusted perpendicular line. That test demonstrated that the adjusted perpendicular line is an equitable boundary². At Figure 35 of its Memorial, the United States tested the proportionality of the equidistant line. It demonstrated that the equidistant line, and, *a fortiori*, the Canadian line, would be inequitable in this case³.

304. Canada agrees that the application of the proportionality test "may also have a useful role" in the case of a single maritime boundary. Canada misapplies the test, however, in two respects: first, Canada includes in its calculation Canadian coastlines within the Bay of Fundy that do not face upon the area being delimited; and, second, Canada denies the applicability of the test in the exterior of the Gulf of Maine area.

305. Canada espouses the unprecedented position that "geography in its socio-economic as well as its physical aspects should properly have a bearing on the identification and treatment of the coastal areas that are relevant to Georges Bank". The manner in which Canada relates this novel argument to the proportionality test is unclear.

306. Canada's views about proportionality are not consistent with the decisions of the International Court of Justice in the *North Sea Continen-*

¹ *United States Memorial*, paras. 242-244.

(40) ² Figure 34 of the United States Memorial indicates that the actual coastline lengths in the area are in a United States-to-Canada ratio of 61:39, and that the adjusted perpendicular line appropriately divides that area in a ratio of 63:37.

(41) ³ Figure 35 of the United States Memorial indicates that, despite the United States-to-Canada coastline ratio of 61:39, the equidistant line divides the area in a ratio of 36:64. As shown at Annex 35, Vol. V, the Canadian line divides the same area in a United States-to-Canada ratio of 31:69.

⁴ *Canadian Memorial*, para. 368.

⁵ *Canadian Memorial*, para. 369.

tal Shelf cases and the *Tunisia/Libya* case, or with the decision of the Court of Arbitration in the *Anglo-French Arbitration*. Proportionality arises out of the equitable principle that a boundary must respect the relationship between the coasts of the parties and the maritime areas in front of those coasts¹. Application of the test of proportionality does not rest, as Canada asserts, upon socio-economic considerations. Rather, its application depends upon the length of the coastlines that face the maritime area being delimited². As the Court of Arbitration stated: "[p]roportionality, therefore, is to be used as a criterion or factor relevant in evaluating the equities of certain *geographical* situations . . ."³.

307. Canada argues that its line is equitable in the interior of the Gulf of Maine area by suggesting that the coastlines of the two States are of comparable length⁴. In its calculation of the Canadian coastline, Canada inappropriately includes the length of the opposing Canadian coastlines within the Bay of Fundy. Inclusion of the Bay of Fundy in such a computation is incorrect in three respects: first, the Bay of Fundy is not being delimited in this case; second, Canadian jurisdiction in the Bay of Fundy is not questioned by the United States⁵; and third, the coastlines of the Bay of Fundy face each other and not the area being delimited. For these reasons, it is not appropriate to include the length of the coastline within the Bay of Fundy in a coastline calculation for purposes of the proportionality test. For such purposes, the Bay of Fundy should be treated as closed, with the length of the closing line across the mouth of the Bay of Fundy included in the calculation of the length of the relevant Canadian coastline⁶.

308. In its Memorial, Canada declined to apply proportionality to the exterior portion of the Gulf of Maine area, arguing that "the 'area' itself and the extent of the environing coastlines are indeterminate"⁷. The exterior area for this purpose is not indeterminate as Canada suggests⁸.

¹ United States Memorial, paras. 242-244. *I.C.J. Reports* 1969, p. 52, para. 98; *Decisions*, pp. 60-61, para. 101; *I.C.J. Reports* 1982, pp. 75-76, para. 103.

² *I.C.J. Reports* 1982, p. 76, para. 104.

³ *Decisions*, p. 60, para. 101. [Emphasis added.]

⁴ Canadian Memorial, paras. 28 and 370.

⁵ Indeed, as noted in the Canadian Memorial: "[i]n 1971 Canada also enclosed certain bodies of water, including the Bay of Fundy, within 'fishery closing lines'." Para. 224, n. 27. Furthermore, the Bay of Fundy is not normally regarded as part of the Gulf of Maine or Atlantic Ocean by the International Hydrographic Organization. See Annex 11, Vol. V.

(40) (41) ⁶ This is the method used at Figures 34 and 35 and Annex 99 of the United States Memorial.

⁷ Canadian Memorial, para. 371.

⁸ Canada's objection in this regard is not substantial. As the Court noted in the *Tunisia/Libya* case, "the exact method of drawing the outer boundaries is not critical, provided the same approach is adopted to each of the two coasts". *I.C.J. Reports* 1982, p. 91, para. 130.

(40) (41) The United States, for example, set appropriate outer limits in applying the test at Figures 34 and 35 of the United States Memorial. Other appropriate outer limits could include the limit of the 200-nautical-mile zone or lines corresponding to a depth contour on the continental shelf¹.

309. There are also coastal features, reflecting changes in coastline direction, that may be used to define the lateral limits of the relevant coastlines for purposes of the proportionality test. In this connection, the United States employed as such lateral limits Nantucket Island and a point on the Atlantic seaboard of Canada just northeast of Halifax. This latter point is on the line perpendicular to the coast from the Chignecto Isthmus where the Canadian coastline beyond the land boundary first radically changes direction². Other points could be identified. All that is required is that like be compared with like³. Any reasonable comparison will show the inequitability of the Canadian line⁴.

(40) (41) 310. Canada argues that "whatever point is selected as the terminus of the relevant coast on the Atlantic seaboard of one country must suggest a coastline of similar extent on the other"⁵. The points marking the lateral limits used by the United States in Figures 34 and 35 of its Memorial meet this criteria when simplified coastlines are considered: the straight-line distance connecting the international boundary terminus, Cape Ann, and Nantucket Island is 294 nautical miles, while the straight-line distance connecting the international boundary terminus, Cape Sable, and the point on Canada's Atlantic seaboard just northeast of Halifax is 225

¹ In the *Tunisia/Libya* case, the Court was able to establish an outer limit for purposes of the proportionality test despite the potential interests of third States within the area considered by the Court. (p. 91, para. 130). The Court stated: "it is the relevant circumstances of the area which will afford the basis for determining whether it is the comparison between the more restricted, or between the more extensive, areas that will determine whether the result is equitable" (pp. 75-76, para. 103).

² Canada recognizes the importance of the change in the direction of the Canadian coast at the Chignecto Isthmus. Canadian Memorial, para. 21.

³ *I.C.J. Reports 1982*, p. 76, para. 104; p. 91, para. 130.

⁴ Annex 99 of the United States Memorial demonstrates that an equidistant line does not meet the proportionality test even on a hypothesis slanted in Canada's favor, i.e., when only the coastline facing the Gulf of Maine—from Cape Sable to Nantucket Island—is included in the calculation. Assuming that the length of the coastline within the Bay of Fundy is omitted, the actual coastline ratio of the United States to Canada between Nantucket Island and Cape Sable is 83:17. The equidistant line divides the area at a United States-to-Canada ratio of 58:42, leaving to Canada an area of 18,058 square nautical miles (61,939 square kilometers) more than Canada would receive if the actual coastline ratio of 83:17 were applied exactly.

⁵ Canadian Memorial, para. 373.

nautical miles. Thus, the coastlines are of "similar extent", as Canada suggests, in a United States-to-Canada ratio of 57:43.

- (110) (111) 311. At Figures 24 and 25, the adjusted perpendicular line proposed by the United States and the Canadian line are tested using this coastline ratio. The lateral limits of the area are defined by perpendiculars to the general direction of the coast at Nantucket Island and the point on the Atlantic seaboard just northeast of Halifax. The 1000-fathom-depth contour is used as the outer limit¹. This is a more restrictive outer limit than that depicted at Figures 34 and 35 of the United States Memorial, and is used to provide another reasonable limit that rebuts the Canadian suggestion that the outer limit is indeterminate.
- (40) (41)

312. The Canadian line would divide this area in a United States-to-Canada ratio of 42:58, and leave to Canada 8,785 square nautical miles more than an exact application of the coastline ratio of 57:43. The adjusted perpendicular line proposed by the United States, on the contrary, meets the proportionality test. It divides the area in a ratio of 62:38, leaving to each Party the approximate area called for by the coastline ratio.

SECTION 4. The Canadian Line Would Disregard the Northeast Channel, Which is a Significant Geomorphological Feature and Natural Boundary Between the Two Separate and Identifiable Ecological Regimes of Georges Bank and the Scotian Shelf, and Which Constitutes a Circumstance Relevant to the Delimitation in this Case

313. Canada's line would cut across Georges Bank, splitting its separate and identifiable ecological regime. The Canadian line would not give effect to the Northeast Channel, which is the only natural boundary in the Gulf of Maine area, and which ensures the integrity of the separate and identifiable ecological regimes of Georges Bank and the Scotian Shelf.

314. The International Court of Justice in the *Tunisia/Libya* case indicated that "certain geomorphological configurations of the seabed, which do not amount to an interruption of the natural prolongation of one Party with regard to that of the other, may be taken into account as a circumstance relevant for an equitable delimitation"². The Northeast

¹ The 1000-fathom-depth contour is not indeterminate. It should be noted that, in the *Anglo-French Arbitration*, the Parties agreed to use a depth contour to mark the seaward limit of the boundary to be determined by the Court of Arbitration.

² *I.C.J. Reports* 1982, p. 64, para. 80. The Court found that one such feature, the Tripolitanian Furrow, was not relevant to delimitation, because the greater and more significant part of that feature lay beyond the area relevant to the delimitation, and because of its position, which was comparatively near to and roughly parallel to the coast. That feature should be contrasted to the Northeast Channel, which is in the relevant area, and which is roughly perpendicular to the general direction of the coast.

Channel is such a geomorphological feature. See Figure 6. Together with the Laurentian Channel, it marks one of only two distinct breaks in the surface of the North American east coast continental shelf. Moreover, the Northeast Channel is located entirely within the area relevant to delimitation, and lies perpendicular to the general direction of the coast within that area in which an equitable boundary should be located¹.

315. There is a close relationship between geomorphological features and the marine environment that has been recognized in past cases concerning fishing rights². In its Memorial, Canada recognizes this relationship. As Canada states:

"Throughout the Gulf of Maine area . . . there is a complex interaction of bottom topography, current structure and biological processes³."

The Northeast Channel is a perfect example of such a relationship. As Part I has confirmed, the Northeast Channel sets the pattern in which water circulates through the Gulf of Maine Basin and around Georges Bank; the Northeast Channel determines the physical characteristics of

¹ The significance of the Northeast Channel is evidenced by the fact that any delimitation that recognizes the Northeast Channel as the natural boundary in the Gulf of Maine area (as does the adjusted perpendicular line proposed by the United States), can satisfy the proportionality test. See Figure 34 of the United States Memorial and Figure 24 of this Counter-Memorial. Even if the relevant area for these purposes were the restricted area set forth at Annex 99 of the United States Memorial, a line recognizing the Northeast Channel as the natural boundary in the exterior of the Gulf of Maine area would, in conjunction with an appropriate boundary in the interior area, divide that restricted area into a ratio that is comparable to the ratio of the simplified United States and Canadian coastlines from Nantucket Island to Cape Sable with a closing line across the mouth of the Bay of Fundy.

² In the *Anglo-Norwegian Fisheries* case, Norway justified its straight-baseline system, in part upon the need to protect the coastal fisheries from overfishing by modern British trawlers. In this regard, Norway stressed the relationship of the coastal fisheries to the numerous banks and ledges within the waters that Norway sought to include within its straight-baseline system. The existence of these banks and ledges was one of the geographical realities of which the Court took note in affirming Norway's exclusive jurisdiction over the sea area there in issue. *I.C.J. Reports 1951*, pp. 127-128.

³ Canadian Memorial, para. 89; see also para. 92.

that water ¹; the Northeast Channel plays a central role in the formation of the separate and identifiable ecological regimes within the Gulf of Maine area; and, the Northeast Channel helps to create and to define a natural boundary, not only in the seabed, but between most of the fish stocks in the water column as well.

316. One way to appreciate the significance of the Northeast Channel as a relevant circumstance is to consider what the marine environment of the Gulf of Maine area would be like if the Northeast Channel did not exist. Chapter III of Annex 1 contains such an analysis. It shows that, if the Northeast Channel did not exist, the water circulation pattern and the physical characteristics of the waters in the area would be changed radically. In such a hypothetical situation, the unusually cold ocean climate found on the Scotian Shelf would extend far to the west and south. Only surface waters regularly would enter the Gulf of Maine Basin. Water would move in a southwesterly direction over the Scotian Shelf, spread into the Gulf of Maine Basin, pass over Georges Bank, and continue down the southern New England coast. The counterclockwise gyre in the Gulf of Maine Basin and the clockwise gyre over Georges Bank would, at the very least, be weakened. Without the benefit of the influx of relatively warmer and more saline water through the Northeast Channel, the waters at the surface in the Gulf of Maine Basin and those over Georges Bank would be no warmer and no more saline than the waters over the Scotian Shelf; there would be a gradual continuum (in terms of temperature and salinity) of surface waters from the northeast to the southwest ². The deeper waters within the Gulf of Maine Basin, as with those in the Baltic Sea, or in Norwegian fjords with sills, would

¹ Oceanographic features in the water column that create and mark separate and identifiable oceanographic and ecological regimes may be compared to the kind of feature identified by the International Court of Justice in the *Tunisia/Libya* case that constitutes an indisputable indication of separate continental shelves or natural prolongations. *I.C.J. Reports 1982*, p. 57, para. 66. For example, the Antarctic Convergence, which is an oceanographic boundary between Antarctic waters to the south and warmer sub-Antarctic waters to the north, and which limits the range of many Antarctic marine species, has been used to delimit the area subject to the Convention on the Conservation of Antarctic Marine Living Resources, done at Canberra, 20 May 1980. Art. I. The Parties to the Convention are Argentina, Australia, Chile, the Federal Republic of Germany, France, the German Democratic Republic, Japan, New Zealand, South Africa, the Union of Soviet Socialist Republics, the United Kingdom, the United States, and the European Economic Community. Belgium, Norway and Poland have signed the Convention.

² The changes in the physical oceanography of the Gulf of Maine area that could be expected if the Northeast Channel did not exist are discussed at Annex 1, The Marine Environment of the Gulf of Maine Area, Chapter III.

gradually increase in salinity, become anoxic, and, for all practical purposes, cease to be productive of living natural resources ¹.

317. In short, without the Northeast Channel, the present juxtaposition of waters of different temperature, salinity, mixing, and circulation that makes the Gulf of Maine area the highly productive area that it is would disappear. As a result of this loss, there would be a gradual continuum in the environment, instead of the separate communities of phytoplankton, zooplankton and benthos, and the separate stocks of fish, that exist today in the Gulf of Maine area. Because the marine environment of the Gulf of Maine Basin and of Georges Bank would be colder, many species (such as the longfin squid, bluefish, northern sea robin, fourspot flounder, butterfish, summer flounder, and spotted hake) no longer would be found in the area. The occurrence of red hake, silver hake, white hake, spiny dogfish, goosefish, and lobster would diminish greatly. Furthermore, because water at the bottom of the Gulf of Maine Basin no longer would be renewed, the Basin would not serve as the prime habitat for redfish, argentine, witch flounder, cusk, wolffish, and thorny skate. Similarly, cod, haddock, herring, pollock, and American plaice would no longer appear in the deep waters of the Gulf of Maine Basin. The nature and abundance of the area's flora and fauna would be diminished further by the weakening of the retention mechanism provided by the gyres in the Gulf of Maine Basin and over Georges Bank. Overall, the fishery resources of the area would be greatly reduced—perhaps by as much as 50 per cent ¹.

318. Thus, it is because of the Northeast Channel that the Gulf of Maine Basin and Georges Bank have distinctive ecological regimes that are different in physical characteristics from the separate and identifiable ecological regime over the Scotian Shelf. No other feature in the Gulf of Maine area has such a profound effect on the marine environment ².

319. Canada seeks to ignore this predominant feature of the marine environment in the relevant area in this case. To disregard such a significant feature, which forms the only natural boundary in the Gulf of Maine area, is to omit a circumstance that is legally relevant to the delimitation of the single maritime boundary in this case. Figure 26.

¹ See Annex 1, Chapter III.

² Because of the importance of the Northeast Channel as a natural boundary, international fishery, scientific, and management organizations have divided their management and statistical units in this area through the Northeast Channel. See Part I, Chapter IV, and Figures 14 and 15. In contrast, any line crossing Georges Bank would cut through its resident fish stocks, severely inhibiting the potential for effective fisheries management. No line crossing Georges Bank would reflect any natural feature. See Section 7 of this Chapter.

SECTION 5. The Canadian Line Would Disregard the Conduct of the Parties and Their Nationals as Circumstances Relevant to Delimitation, Particularly the Predominant Interest of the United States on Georges Bank and in the Gulf of Maine Basin

320. The United States and its nationals have used Georges Bank and the Gulf of Maine Basin for several centuries. The United States has exercised governmental responsibilities in those areas. These activities give rise to the predominant interest of the United States and constitute a relevant circumstance in this case. This relevant circumstance is disregarded by Canada in its Memorial.

A. THE CANADIAN LINE IS NOT SUPPORTED BY CANADA'S RECENT AND LIMITED FISHING ACTIVITY ON GEORGES BANK, AS CONTRASTED TO THE DEVELOPMENT OF THE FISHERIES OF GEORGES BANK AND THEIR LONGER AND FULLER USE BY THE UNITED STATES

321. Georges Bank was fished almost exclusively by the United States from the early 19th century until 1954. The United States fishery on all parts of Georges Bank is one that is rich in tradition. The Canadian Memorial seeks to portray a Canadian fishery on Georges Bank in the 19th and first half of the 20th centuries when, in fact, one did not exist. The meager evidence cited by Canada in support of its contentions only confirms the incidental nature of Canada's activity on Georges Bank prior to 1954, when Canada first reported to ICNAF Canadian catches from Georges Bank¹.

322. The fishing activity that Canada alleges to be relevant began recently, only 16 years before the first boundary negotiations were held in 1970. This Canadian fishing only became significant in the early 1960s. This limited period is to be compared to over 150 years of United States fishing in the same area².

323. Canada's fishing activity is not only recent, it is also related primarily to one fishery, scallops³. The size and importance of the Canadian interest in the Georges Bank fisheries is and will remain variable, since it is so closely related to this one species. As even the short history of the Canadian Georges Bank scallop fishery demonstrates,

¹ See Part I, Chapter IV, Section 2, and ICNAF Second Annual Report, 1951-52, Part 4. Annex 16, Vol. V.

² Thus, Canada cannot demonstrate that its fishing activity on Georges Bank is evidenced by the long use required in the *Anglo-Norwegian Fisheries* case. Nor does Canada's fishing on Georges Bank compare to the fishing by the United Kingdom and the Federal Republic of Germany in the waters off Iceland in the *Fisheries Jurisdiction* cases. See Part II, Chapter II, Section 1.A., of this Counter-Memorial.

³ Canadian Memorial, para. 140.

scallop abundance, and catches, can vary enormously¹. Canada also depends upon a single market—the United States—to absorb almost all its scallop catch². Future demand in the United States is unpredictable³. Finally, changes in Canadian fishing policy (for example, changes as important as those recommended in the recent Kirby Report⁴) could alter the balance of forces in the fishing industry, with important effects on the scallop fishery.

324. Canada portrays the fishery on Georges Bank as one in which the United States and Canada, in Panel 5 of ICNAF, acted in “partnership”. The facts, set forth at Annex 3, show a different pattern. This pattern confirms that the United States has the predominant interest in Georges Bank, and that Canada’s interest is centered on the areas to the northeast of the Northeast Channel, on the Scotian Shelf.

325. Canada alleges that the fisheries of Georges Bank have a special significance for southwest Nova Scotia⁵. In Part I, Chapter IV, of this Counter-Memorial, the United States has demonstrated that there is no historic basis for this assertion⁶. Moreover, the abundant fisheries off the Canadian east coast attest otherwise⁷. Canada’s activity on Georges Bank, in many respects, is comparable to that of third States⁸. Those other fishing States have had to make readjustments to the changing conditions of the 200-nautical-mile zone. United States fishermen were forced to make such an adjustment when Canada unilaterally expelled United States fishermen from their traditional grounds off Canada’s coast in 1978⁹. Canada, by its submission, nonetheless has sought to avoid making any comparable adjustment in its east coast fisheries.

99 ¹ Figure 10, *supra*..

² Canadian Memorial, para. 162.

³ The dangers of relying upon a single product sold to a limited market are illustrated by the case of swordfish. The United States and Canada essentially banned swordfish in 1971 because of high mercury content.

⁴ The Kirby Report is a recent Canadian study making recommendations about the future of Canada’s Atlantic fisheries. It is discussed further at Annex 4, Vol. III, and relevant portions are included at Annex 36, Vol. V.

⁵ Canadian Memorial, para. 318.

⁶ See Annex 7, Vol. IV.

⁷ See The Kirby Report, Chapter 12, at Annex 36, Vol. V.

⁸ See Table A, *supra*.

⁹ The extension of coastal-State fishery jurisdiction to 200 nautical miles also forced United States fishermen out of traditional fisheries in other areas of the world. For example, the United States shrimp fishery off northeastern South America involved as many as 460 United States vessels, and produced total catches as high as 13.6 million pounds. The United States shrimp fishery off

B. THE CANADIAN LINE DISREGARDS THE FISHERMEN FROM MAINE AND NEW HAMPSHIRE WHO HAVE FISHED ON GEORGES BANK IN THE PAST AND WHO DO SO TODAY; THE CANADIAN LINE OVERLOOKS THE FUNDAMENTAL INTEREST IN THIS CASE OF THE STATES OF MAINE AND NEW HAMPSHIRE

326. Maine and New Hampshire are relevant to this case not only because of geography, but also because of the long and continuing use that fishermen from Maine and New Hampshire have made of this area¹. Fishermen from Maine and New Hampshire have contributed to the predominant interest of the United States on Georges Bank and in the Gulf of Maine Basin. Fishermen from these States have fished on Georges Bank in the past and do so at the present time¹. As indicated in Part I, Chapter IV, fishermen from Maine also fished for a long time on Browns Bank and on other banks off the coast of Nova Scotia and Newfoundland.

327. When Canada unilaterally expelled United States fishermen from the Canadian 200-nautical-mile fishery zone in 1978, many fishermen from Maine shifted to the northeastern portion of Georges Bank². They already have borne the burdens of adjusting to the new situation resulting from the extension of Canada's fisheries jurisdiction to 200 nautical miles, while Canada's east coast fishermen have not.

328. Canada's denials to the contrary, the state of Maine has had a fundamental interest in this case from the outset. Even before the extension of fisheries jurisdiction in 1977, the state of Maine actively encouraged the United States federal government to maintain its continental shelf position. Maine engaged the late Judge Richard R. Baxter, then a Professor of Law at Harvard University, to assist the state in evaluating the position of the United States in the dispute³. Thus, even

(footnote continued from previous page.)

Mexico also was large and well-established. In 1974, this fishery caught over 10 million pounds of shrimp, valued at U.S.\$15,000,000. Over 600 United States vessels fished for shrimp, at least occasionally, in the waters off Mexico. Following the extension by Mexico of its fisheries jurisdiction to 200 nautical miles in 1976, the United States shrimp fishery was limited, pursuant to agreements between the United States and Mexico to 5.5 million pounds and 318 vessels for the 1976-1977 fishing year, and was eliminated at the end of 1979.

¹ The many inaccurate statements in the Canadian Memorial that imply that fishermen from Maine and New Hampshire have no past or present interest in the outcome of this case have been previously noted. See Part I, Ch. IV, Sec. 4.

² *Ibid.*, see also, Annex 42, Vol. V.

³ It was for this reason that Judge Baxter informed the President of the Court that he would not take part in the decision in this case.

before the unilateral expulsion of United States fishermen from Canadian waters in 1978, Maine's interest in this boundary dispute was fully evidenced¹.

C. THE CANADIAN LINE IS NOT SUPPORTED BY THE EXERCISE OF GOVERNMENTAL RESPONSIBILITY IN RELATION TO GEORGES BANK AND THE GULF OF MAINE BASIN

329. In its Memorial, Canada fails to show an exercise of governmental responsibility comparable to that of the United States in the Georges Bank and Gulf of Maine Basin areas. The United States demonstrated in its Memorial that, in those areas, it has done all the charting and surveying, conducted most of the scientific research, and assumed primary responsibility for defense and search and rescue operations. Figures 14 through 18, in Part I, indicate that the Parties consistently have divided responsibility at or near the Northeast Channel, and never at the middle of Georges Bank. These Figures also confirm the significance of the Northeast Channel as a circumstance relevant to a boundary delimitation in this case.

D. THE CANADIAN LINE IS NOT SUPPORTED BY THE REJECTED AND UNRATIFIED 1979 EAST COAST FISHERIES AGREEMENT, WHICH IS LEGALLY IRRELEVANT AND FACTUALLY INCONSISTENT WITH CANADA'S CONTENTIONS

330. Canada argues that the failed 1979 east coast fisheries agreement is relevant to this case, suggesting that it should be "taken into account as evidence of Canada's status as a coastal State in relation to Georges Bank, of Canada's established share in the Georges Bank fishery, and of the fundamental justice of a maritime boundary that will maintain ... Canadian presence on the Bank²". Part II of this Counter-Memorial has established that a rejected and unratified treaty does not create obligations or rights for the States that negotiated it, and cannot be invoked to the prejudice of a negotiating State in a dispute relating to the subject matter of such a failed agreement. Quite apart from such legal considerations, Canada's assertions are not supported by the content of the rejected and unratified agreement. In effect, Canada seeks to penalize the United States for engaging in good-faith negotiations. Any recognition by this Court of the failed agreement would prove detrimental to settlement negotiations between States.

¹ The interest of the state of Maine in this case, as well as the interests of the other New England states, is not limited to fisheries. These states have an interest in potential sources of energy as well. See Annex 6, Vol. IV.

² Canadian Memorial, para. 276.

1. In Addition to Being Legally Irrelevant, the Canadian Argument Regarding the Rejected and Unratified East Coast Fisheries Agreement is Not Supported by the Content of that Agreement

331. The failed 1979 fisheries agreement did not concern Georges Bank or the northeastern portion of the Bank alone. Had that agreement entered into force, it would have established an "elaborate regulatory system" for jointly allocating fishery resources and managing fishing activity from Newfoundland to North Carolina¹. The agreement would have provided for a Canadian presence and voice with regard to the fisheries of Georges Bank and fisheries as far to the southwest as North Carolina. It also would have protected, however, traditional United States fisheries in ICNAF Subareas 3 (off Newfoundland) and 4 (off Nova Scotia), and provided for a United States voice in the management of those fisheries off Canada's coast. Thus, the failed agreement was a complex, integrated arrangement. From the United States perspective, it was premised upon United States access to fisheries off Nova Scotia and Newfoundland. Accordingly, the content of the failed agreement does not, in fact, support Canada's assertions².

332. The unilateral termination by Canada, in 1978, of traditional United States fisheries in Subareas 3 and 4, was central to the failure of the 1979 fisheries agreement. Canada asserts that the reason for its unilateral termination of reciprocal fishing was the threat that United States fishing posed to the conservation of Georges Bank stocks. In this connection, Canada claims that the informal 1978 reciprocal fishing agreement "was operating in a manner that was increasingly damaging to Canadian interests"³.

¹ Canadian Memorial, para. 264.

² Aspects of the failed agreement are described at paras. 264-270 of the Canadian Memorial.

³ While Canada has focused on some aspects of the failed agreement relating to Georges Bank, other aspects, such as the maintenance of the United States fisheries off Canada's coast and the dominance of the United States in the Georges Bank fisheries under the rejected and unratified agreement, were not identified. Canada's selective focus on content results in a distorted picture of the underlying concept of the negotiations, which was to seek a separation of fishery-management questions from boundary questions as such. The boundary was to be left to binding third-party settlement, and the failed fisheries agreement was to be without prejudice to that question. Canada is fundamentally in error when it states that "the basic premise of the . . . negotiations was that the boundary and resource issues should be dealt with not in isolation but as an integrated whole". Canadian Memorial, para. 255.

⁴ Canadian Memorial, para. 237.

333. Canada's stated concern for conservation is not borne out by its actions. In 1977 and 1978, the Canadian fleet expanded significantly its fishing effort on Georges Bank¹. Canadian newspaper reports indicated that the motivation behind Canada's termination of reciprocal fishing and increase in fishing effort was to acquire increased leverage in the ongoing negotiations, excluding United States fishermen from waters off the Canadian coast, while asserting a claim to waters off the United States coast².

334. The Canadian action in unilaterally terminating reciprocal fishing in June, 1978, seriously eroded political support for the proposed agreement in the United States. United States fishermen who had once stood to benefit from the agreement, particularly fishermen from Maine and Boston, either left fishing because of Canada's unilateral action of closing United States fisheries more than 200 years old, or made adjustments into other fisheries, including the Georges Bank fisheries, off the United States coast. Whatever interest remained in the agreement was not sufficiently strong to overcome the objections of other United States fishermen. Those fishermen recognized that Georges Bank was the last major fishing ground available to United States fishermen on the northeast Atlantic coast where traditional catches of cod and haddock could be caught. They also recognized that access to the scallop beds on the northeastern portion of the Bank was required to maintain yearly scallop catches at relatively constant levels. Those fishermen believed strongly that United States jurisdiction over all of Georges Bank should not be sacrificed under any agreement in order to achieve limited United States readmission to Subareas 3 and 4 off Canada.

335. Canada's departure from the Joint Report of the Special Negotiators of 15 October 1977³ was another important reason why the failed 1979 east coast fisheries agreement did not gain the support of United States fishermen or that of the United States Congress. That joint report produced the context within which the two sides agreed to conduct the negotiations. Throughout the seventeen months between the 15 October 1977 Report and signature of the proposed agreement, a number of

¹ Part I, Chapter IV, para. 70, and Annex 18.

² For the Canadian perspective in terminating the 1978 interim fisheries agreement, see two articles reprinted from the *Halifax Chronicle-Herald* of 3 June 1978. Annex 40, Vol. V.

³ Canada refers to the Joint Report of 15 October 1977 at Canadian Memorial, para. 251, and reproduces it at Annexes, Vol. II, Annex 36. Canada states that the failed agreement "faithfully reflected" the Joint Report. [Paras. 251 and 263.]

factors emerged to change that negotiating context¹. Most importantly, Canada's unilateral termination of United States fishing off Canada's coast had a profound effect. Furthermore, when the United States negotiator suggested a 10-year time frame, as had been contemplated by the 15 October 1977 Report², Canada took the view that the only acceptable fishery agreement would be a permanent one³. Canada refused to budge from this position⁴.

336. Canada argues that the rejected and unratified agreement "reflects an established tradition of North American fisheries relations"⁵. As Canada is aware, however, the history of east coast fishery cooperation is one marked by many agreements that were negotiated but subsequently failed to enter into force⁶.

2. The Canadian Argument Seeks to Penalize the United States for Engaging in Good-Faith Negotiations

337. Canada argues that any adjudicated boundary that does not accord Canada certain of the rights envisioned in the failed fisheries agreement would be inequitable. Canada's position is that, if under a rejected and unratified fisheries agreement Canada would have been entitled to a share of the fish of Georges Bank, then Canada should be entitled to a share of the Bank under an equitable delimitation of the single maritime boundary.

338. This argument must be rejected by the Court. The failed 1979 east coast fisheries agreement ultimately was not accepted by the United States, because it was deemed fundamentally unfair. The Canadian position attempts to penalize the United States for engaging in good-faith,

¹ The understandings contained in the report were reached at a time when the United States and Canada each had less than one year's experience in managing a 200-nautical-mile fishery zone. At the time, expectations in the fishing communities of both States were in the early stages of formulation. As time passed, there was an increasing awareness on the part of United States and Canadian officials of the implications of the 200-nautical-mile zone.

² The Attachment to the Joint Report of 15 October 1977, "Principles For A Joint Fisheries Commission To Be Established By A Convention Between Canada and the United States", provided, at para. XIII, for "Provision For Withdrawal Upon Notice". Canadian Memorial, Annexes, Vol. II, Annex 36, p. 262.

³ Canada discusses its departure from the Joint Report at Canadian Memorial, para. 254.

⁴ The proposed perpetual nature of the failed fishing agreement may have been the single most decisive factor uniting United States fishermen against it.

⁵ Canadian Memorial, para. 274.

⁶ See United States Memorial, para. 67., n. 3 and Annex 17. See also Canadian Memorial, Annexes, Vol. I, Historical Introduction. Recently, the 1978 interim fisheries agreement failed to enter into force because of Canada's refusal.

though unsuccessful, negotiations. If accepted by the Court, the Canadian argument would render disputes around the world over marine resources and jurisdiction infinitely more resistant to solution. Any rule that would impede the full, free, and vigorous pursuit of negotiated solutions to disputes would be incompatible with a fundamental requirement of international legal order and must be rejected.

339. In this connection, one additional matter must be noted. During this dispute, the United States has acted with restraint and has not enforced its laws or exercised its rights, with respect to Canada, in the boundary region. These acts of forbearance were for purposes of facilitating a peaceful resolution of the dispute and avoiding serious conflict between the Parties pending such resolution. These actions were undertaken in reliance upon the view that restraint would not be legally or factually prejudicial to the interests of the United States¹. Indeed, were these acts of forbearance adversely to affect the interests of the United States, the United States and doubtless other States would have to reexamine their positions in other disputes².

SECTION 6. Considerations of Purported Economic Dependence and Relative Wealth, Upon Which Canada Relies to Support Its Line, Are Not Legally Relevant; Even if Such Considerations Were Legally Relevant, the Facts, When Fully and Fairly Analyzed, Do Not Support Canada's Claim

340. In Part I of its Memorial (as amplified in Part I of this Counter-Memorial), the United States presents those facts it believes to be legally relevant to the delimitation of the single maritime boundary in the Gulf of Maine area. With respect to fishing activities carried out by nationals of the Parties, the United States demonstrated the longer, fuller, and, until recently, almost exclusive use that its nationals have made of the fisheries of Georges Bank and the Gulf of Maine Basin.

¹ Articles 74(3) and 83(3) of the Convention adopted by the Third United Nations Conference on the Law of the Sea each provide:

"Pending agreement as provided for in paragraph 1, the States concerned, in a spirit of understanding and co-operation, shall make every effort to enter into provisional arrangements of a practical nature and, during this transitional period, not to jeopardize or hamper the reaching of the final agreement. Such arrangements shall be without prejudice to the final delimitation."

United Nations Convention on the Law of the Sea, opened for signature 10 Dec. 1982.

² This pattern of United States activity is to be compared to that of Canada, which, in the midst of negotiations in 1977, notified the United States of its intention to expand its claim, and which chose in 1978 unilaterally to exclude United States fishermen from their traditional fisheries in Subareas 3 and 4 off of Canada.

341. In its Memorial, Canada argues that economic dependence and relative wealth are legally relevant to delimitation. Canada goes so far as to assert that economic dependence is entitled to "special weight in the balancing-up of all the relevant circumstances".

342. As was shown in Part II of this Counter-Memorial, the law relating to the delimitation of maritime boundaries has rejected the relevance of economic dependence and relative wealth, because of their variable and unpredictable character. The measurement of economic dependence and relative wealth unavoidably requires that assumptions be made, parameters chosen, and data selected. Depending upon the decisions that are made in this regard, the rich can be made to appear poor and the poor, rich. Moreover, even if they could be measured accurately, because they are variable and unpredictable, purported economic dependence and relative wealth should not determine a boundary designed to last forever. Finally, such considerations are not legally relevant because, otherwise, States would be discouraged from bringing disputes before the Court, thereby undermining the peaceful settlement of disputes².

343. Canada relies heavily upon assertions about economic dependence to support its position. In an effort to correct the record, the United States has analyzed the Canadian socio-economic arguments for the Court's information, despite their irrelevance as a matter of law. Annex 4. That analysis leads to the conclusion that, even if economic dependence and relative wealth were legally relevant, the adjusted perpendicular line proposed by the United States is a more equitable solution than any boundary crossing Georges Bank.

344. The description in the Canadian Memorial of Canadian fishing activities is incomplete and misleading. It relies upon statistics from an unrepresentative period that do not reflect either the historic activities of the Parties in the area or their present activities³. Canada also exaggerates the economic importance of its fishery on Georges Bank to its economy. Fishing on Georges Bank does not make a significant contribution to the national economy of Canada⁴. Even in terms of the regional economy of Nova Scotia, the contribution of this fishing is not great⁴.

¹ Canadian Memorial, para. 311.

² If considerations of economic dependence and relative wealth were to be made legally relevant, it is questionable whether the "richer" of two States would ever be prepared to resort to binding third-party dispute settlement procedures.

³ The fishery statistics proffered in the Canadian Memorial refer to 1969-1978, an unrepresentative period. See Part I, Chapter IV, Section 2, of this Counter-Memorial and Annex 4, Vol. III, A Factual Analysis of the Socio-Economic Arguments in the Canadian Memorial, Chapter I.

⁴ Annex 4, Vol. III, Chapter I.

345. Although the contribution that fishing on Georges Bank makes to the economy at the local level is significant in certain cases, it is significant only to a few towns in Nova Scotia. Moreover, the contribution of such fishing to the economies of those few communities in Nova Scotia does not approach that suggested in the Canadian Memorial¹.

346. Canada, in suggesting that Nova Scotia is a one-dimensional, largely poor, rural, and fishery-based economy², understates the strength and diversity of the Nova Scotia economy and the standard of living of its inhabitants³. That economy, reflecting its developed character, is strong and diverse. The standard of living in Nova Scotia compares favorably with the rest of Canada⁴. The economy of Nova Scotia has far more flexibility to absorb any effects resulting from confirmation of United States jurisdiction over Georges Bank than Canada suggests. Besides the many opportunities in the fishing industry, particularly the enormous potential for expansion in Canada's fisheries off Newfoundland⁵, Canada's own studies report that Nova Scotia is on the brink of an era of significant development as the result of major discoveries of natural gas on the Scotian Shelf⁶.

347. The adjusted perpendicular line proposed by the United States, on the one hand, respects Canada's interests in the Scotian Shelf. The Canadian line, on the other hand, would, if adopted, unduly and unnaturally restrict New England fishermen to an area smaller than they historically have had available to them, especially in light of Canada's unilateral expulsion of United States fishermen in 1978 from their traditional fisheries in Subareas 3 and 4 off Canada. The traditional fish stocks along the United States east coast are fully utilized. In contrast to the alternatives available to Nova Scotia fishermen, there is no place for displaced New England fishermen to go⁶.

¹ Annex 4, Vol. III, Chapter II.

² See generally Canadian Memorial, paras. 62, 120, 143, and 169.

³ Annex 4, Vol. III, Chapter III.

⁴ Annex 4, Vol. III, Chapter III, Section 2.

⁵ Annex 4, Vol. III, Chapter III, Section 3.

⁶ Canada's argument that its purported economic dependence upon Georges Bank is relevant to the delimitation of the single maritime boundary in the Gulf of Maine area must be examined in the context of Canada's extension of its fishery jurisdiction from 12 to 200 nautical miles. Canada benefitted greatly from the creation of its own 200-nautical-mile zone and from the restrictions it placed upon foreign fishing. This is evident in the increase in Canadian catches that resulted from the extension of Canadian fishery jurisdiction. In 1975, Canadian catches for

348. Thus, even if economic dependence and relative wealth were legally relevant, which they are not, the adjusted perpendicular line proposed by the United States produces an equitable solution, while the Canadian line would not.

SECTION 7. The Canadian Line Would Not Take Account of the Two Equitable Principles that the Boundary Should Facilitate Resource Conservation and Management, and that the Boundary Should Minimize the Potential for International Disputes

349. Canada's line cuts across Georges Bank—which Canada admits is a "semi-discrete marine ecosystem"¹—dividing the resident stocks of fish and shellfish associated with Georges Bank. Canada's line thus is inconsistent with the equitable principle that the boundary should facilitate resource conservation and management², as well as the equitable principle that the boundary should minimize the potential for international disputes³.

A. THE CANADIAN LINE WOULD HINDER CONSERVATION AND MANAGEMENT OF THE FISHERY RESOURCES OF GEORGES BANK

350. In its Memorial, the United States listed 16 commercially important species in the Gulf of Maine area, and noted that there were stocks of 12 of these species associated with Georges Bank. The United States demonstrated that these stocks would be divided by an equidistant line⁴. Similarly, the Canadian line, or any other line crossing Georges Bank, would cut through these 12 stocks. By contrast, these stocks would not be divided by the adjusted perpendicular line proposed by the United States. The other four species will be divided by whatever boundary is delimited in the Gulf of Maine area.

351. An analysis of additional stocks of commercially important species in the Gulf of Maine area demonstrates that the only stocks divided by the adjusted perpendicular line proposed by the United States

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all ICNAF subareas totalled 789,655 metric tons. In 1980, Canadian east coast catches, excluding catches from Subarea 5, totalled 1,084,641 metric tons. The Canadian catch in Subarea 5 adds only an additional four per cent, or 30,583 metric tons to the total increase in Canadian catch as a result of the extension of Canada's fishery jurisdiction on its east coast from 12 to 200 nautical miles. See *ICNAF Stat. Bull.*, 1975, Vol. 25, pp. 32, 65; *NAFO Stat. Bull.*, 1980, Vol. 30, pp. 18, 28, 61. The ICNAF and NAFO statistics have been adjusted to use scallop meat weight rather than scallop shell weight.

¹ Canadian Memorial, paras. 89 and 93.

² United States Memorial, paras. 247-251.

³ United States Memorial, paras. 252-256.

④ ⁴ United States Memorial, paras. 316-319 and Figure 36.

are stocks of wide-ranging species, such as mackerel¹. Such stocks, however, will be divided by *any* boundary in the area. By contrast, *all* resident stocks on Georges Bank, as well as stocks of wide-ranging species, would be divided by the Canadian line.

352. Any boundary crossing Georges Bank, including the Canadian line, would relegate the resident Georges Bank stocks to the status of common pool resources. Historically, fishermen from different States have adopted the attitude that they should take as much of common pool resources as they can, because, if they do not, fishermen from another State will. That competitive attitude, if not regulated, leads to the depletion and reduced productivity of the stocks. The Canadian line, by providing to Canada access to the Georges Bank stocks, creates such competition between the two States. Recently, the "tragedy of the commons" was referred to in the Canadian Kirby Report as follows:

"The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. . . . The rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all²."

353. The United States Memorial describes some of the conservation and management problems associated with common pool resources, as follows:

"The management objectives of States that share stocks are often contrary and difficult to reconcile. One State, for example, may prefer to accept large reductions in current catches in hopes of larger future harvests; the other may not be willing to accept the short-term dislocations inherent in such a policy. One State may prefer as a matter of nutritional or employment policy to harvest the maximum sustainable yield of a given stock; the other may prefer to maximize profit by capturing fewer fish but a greater catch per unit of effort. One State may wish to

¹ See Annex 1, The Marine Environment of the Gulf of Maine Area.

² G. Hardin, "The Tragedy of the Commons", in *Science*, 1968, quoted in the Kirby Report. Annex 36, Vol. V.

maximize the yield of a single valuable species in a mixed-species fishery, while the other State may prefer to accept lower yields of that species in order to maximize the yield of the entire fishery. There may also be disagreements over management techniques, such as basic choices between gear types, setting annual quotas or fixing minimum fish sizes, year-round or seasonal fishing, and limited entry or free competition, as well as scientific disputes concerning such matters as the status of the stock, the amount of allowable catch, and the effect of proposed management measures. These disagreements are more than technical. They affect how much is caught, when, and by whom¹."

354. This common pool problem, which militates against resource conservation, is compounded in the case of Georges Bank because of the seasonal movement of important stocks. Table C² shows the percentages of cod, haddock, and yellowtail flounder stocks taken on the northeastern portion of Georges Bank and on the remainder of the Bank, during the bottom trawl survey cruises conducted by the United States National Marine Fisheries Service in the spring, summer, and autumn of 1980.

TABLE C

	COD		HADDOCK		YELLOWTAIL FLOUNDER	
	North-eastern Portion	Remaining Portion	North-eastern Portion	Remaining Portion	North-eastern Portion	Remaining Portion
SPRING	47.8%	52.2%	78.1%	21.9%	63.2%	36.8%
SUMMER	75.7%	24.3%	96.1%	3.9%	0.8%	99.2%
AUTUMN	55.7%	44.3%	67.6%	32.4%	53.6%	46.4%

As can be seen, at certain seasons of the year, fishermen on the northeastern portion of Georges Bank have access to a high percentage of important Georges Bank stocks. Thus, if the Canadian line had been a boundary in force between the Parties in 1980, United States fishermen would not have had access to an area in which two-thirds of the haddock stock were to be found, regardless of the season. Over 60 per cent of the Georges Bank yellowtail flounder stock would have been subject to Canadian fishing pressure during the spring, while 99.2 per cent of that stock would have been available to United States fishermen during the

¹ United States Memorial, para. 189, n. 1.

² See Annex 38, Vol. V.

summer. A similar pattern would have been evidenced in the cod fishery. This is the essence of the common pool. If Canadian fishermen caught all that they were able to in the spring, they would greatly reduce the fish available to United States fishermen during the summer. Similarly, heavy United States fishing in the summer could reduce the stocks, and preempt the Canadian fishery in the spring¹.

355. Although the percentages vary from year to year, these patterns are far from unusual. Moreover, such patterns apply to other stocks as well. Large percentages of the same stocks are available in different parts of Georges Bank, depending upon the season². In order for United States fishermen to maintain their traditional catches of these stocks, they must have access to them throughout their range, particularly in locales where the stocks concentrate seasonally, such as on the northeastern portion of Georges Bank. Thus, when Canada states that Georges Bank groundfish stocks "range over large areas of the Bank and become available for capture in the undisputed waters of the United States zone"³, it is espousing an erroneous and misleading view of the Georges Bank ecological regime and the fisheries it supports. The Canadian line would deny to the United States its historic access to stocks that its fishermen have fished for centuries, and that supply traditional fresh fish markets in the eastern United States. Canada, on the contrary, exports to other countries a large share of its catch of these species⁴. The groundfish and scallop stocks on Georges Bank were fully utilized by the United States before Canada recently entered those fisheries. In order to achieve that utilization, United States fishermen fished the entire Bank. The large concentrations of stocks on the northeastern portion of Georges Bank during some seasons, the seasonal movements of the stocks, and the yearly fluctuations in stock movement and abundance must all be taken into account in the management and utilization of a fishery such as that on Georges Bank. Canada is mistaken when it states that "the undisputed part of Georges Bank gives the United States an ample resource base to sustain a healthy fishery and allow potential for future growth"⁵.

¹ The percentages in Table 3 are not catch figures. Nonetheless, in a common-pool situation, there is a relationship between fishing pressure and stock availability. Fishermen may be expected to take advantage of the situation that exists, with overfishing the likely result.

² See Annex 38, Vol. V.

³ Canadian Memorial, para. 118.

⁴ Canadian Memorial, para. 162.

⁵ Canadian Memorial, para. 140. Unlike Canada, with its vast northern resources, the United States has no alternative cod or haddock stocks to which its fishermen may turn. Furthermore, the alternative yellowtail flounder stock off southern New England is fully utilized.

356. Another way of illustrating the common pool issue is to consider the number of stocks (and their potential yield) that would require joint management if the Canadian position were to be upheld in this case. As is shown by the tables at Annex 37¹, the adjusted perpendicular line proposed by the United States leaves to Canada's sole management and use 56 per cent of the potential finfish and squid fisheries yield in Subareas 2 through 6. The United States would manage and use 29 per cent. Fifteen per cent would be subject to joint management. The Canadian line would double the potential yield, and more than triple the number of stocks subject to joint management. It would cut in half the potential yield subject to exclusive United States management and use, and greatly increase the potential for dispute.

357. Accordingly, the Canadian line not only would deny to the United States full access to stocks that are the foundation of the New England fishing industry, but would also exacerbate forever the knotty problem of common-pool resource management. The adjusted perpendicular line proposed by the United States has no such harmful effects.

B. THE CANADIAN LINE WOULD NOT MINIMIZE THE POTENTIAL FOR INTERNATIONAL DISPUTES

1. *The Canadian Line Would Create a Perpetual Dispute Over the Division of the Fishery Resources*

358. The Canadian line, by dividing the Georges Bank stocks between the United States and Canada, would enable the fishery resources to be depleted by fishing on either side of the line. In other words, the size of the Canadian catches would affect the size of the United States catches, and vice versa. Such a direct conflict of interests is inevitably productive of disputes. The distribution of resources between the fishermen of two or more States is notoriously difficult to resolve by negotiation, as witnessed, for example, by the history of the failed 1979 fishery agreement. Fishery disputes on the east coast have affected relations between the United States and Great Britain, and the United States and Canada, since the founding of the Republic. A boundary that permanently divides the Georges Bank resident fishery stocks between the two States would ensure that the potential for fishery disputes between the United States and Canada would exist forever.

¹ There are five tables in Annex 37. Table 1 is an Assessment of the Potential Annual Yield for Stocks in Subareas 2, 3, and 4. Table 2 is an Assessment of the Potential Annual Yield for Stocks in Subareas 5 and 6. Table 3 is an Assessment of Potential Annual Yield for the four cross-Subarea Stocks—mackerel, pollock, shortfin squid (illex), and argentine. Table 4 identifies the Subarea 5 and 6 stocks that would become cross-boundary stocks if the Canadian line were to be upheld in this case. Table 5 compares the adjusted perpendicular line proposed by the United States to the Canadian line with regard to the potential yield that would be subject to Canadian single-State management, United States single-State management, or joint management.

2. *The Canadian Line Would Bring into Direct Conflict the National Fisheries Policies of the Parties*

359. The Parties differ sharply in their basic policies of fisheries management, adding significantly to the complicated task of reaching and maintaining agreement on the conservation and management of any transboundary stocks. In large measure, it was the clash of these policies, which were only fully evidenced after each government had experience in managing a 200-nautical-mile zone, that made it impossible for the United States to ratify the failed 1979 east coast fisheries agreement. The Canadian line would bring the national fishery policies and practices of the two countries into direct conflict with respect to the resources of Georges Bank.

360. Canada manages its Atlantic fisheries as an economic development program for Atlantic Canada as a whole¹. Consequently, Canadian federal fisheries managers are required to balance the often conflicting requirements of conservation of the resource and broad social and economic objectives. Canada uses an area and quota licensing system to restrict fishermen to certain fisheries. The Canadian licensing system reflects a number of governmental assumptions about the promotion of economic development in Atlantic Canada². In order to carry out the necessary balancing of objectives, the Canadian government has become extensively involved in the management of the Canadian fishing industry, as well as in the management of the stocks.

361. The United States has evolved a different policy for the management of fisheries. In the United States system, the federal government only provides scientific, enforcement, and other support services to a group of fishery management councils in each region of the country³. These councils are charged with recommending the specific objectives for each fishery, subject to certain broad national standards concerning conservation and full utilization of the resources and for proposing management plans to achieve these objectives. These standards require that the fisheries be managed for the benefit of the fishing industry and the consumer, rather than as an economic development program for the society at large⁴.

¹ See the Kirby Report, Chapter 10, at Annex 36, Vol. V.

² See Annex 4, Vol. III, Appendix D.

³ Fishery Conservation and Management Act, sec. 302, 16 U.S.C. sec. 1852; reprinted at United States Memorial, Annex 8, Vol. I.

⁴ The Fishery Conservation and Management Act allows for the possibility of establishing systems to limit entry into a fishery, subject to certain conditions. Nevertheless, the regional fishery management councils normally have rejected this option. Management plans usually rely upon market forces to adjust the number of vessels in a fishery.

362. The divergent management policies of the United States and of Canada are deeply rooted in their differing historical experiences, cultures, and political structures. Both States are committed to the conservation of fisheries resources. Nevertheless, to the extent that these different systems are required to be accommodated in the management of trans-boundary stocks, there is an increasing probability of disputes and stalemate. Poor conservation of the resource, and an impaired benefit for the users of the resource are the likely result.

363. For example, the system of licensing vessels only for specific areas and species used by Canada to manage its fisheries and fishermen is an attempt to match fishing pressure with its broad social and economic objectives. For instance, the system is used to protect the interests of inshore fishermen of Nova Scotia and New Brunswick by denying large offshore vessels access to the inshore fishery. It also is used to prevent Nova Scotia vessels from fishing in waters off Newfoundland. Thus, the Canadian licensing system requires annual predictions of stock size, fishing effort, catch, and an annual allocation between user groups. It is not a flexible system. Vessels often are prevented from switching to other fisheries, although there may be an unexpected abundance in those fisheries¹.

364. The United States approach to the conservation and management of the fisheries of Georges Bank is predicated upon the fact that the Georges Bank stocks tend to be variable and unpredictable, while the total biomass of the Georges Bank ecological regime is relatively stable. Thus, United States fishermen are allowed, and even encouraged, to switch from stock to stock, depending upon the abundance. This method of fishing tends: (1) to stabilize fishermen's income, and (2) to reduce fishing pressure on stocks of low abundance—when reproductive potential is most jeopardized by fishing. The United States approach deemphasizes the intractable problem of predicting the yearly variability of individual stock yields and of allocating between users on the basis of such predictions. Conservation is achieved by constraining fishing on immature fish (through mesh rules and minimum sizes), and by establishing closed areas during the spawning season².

¹ Annex 4, Vol. III, Appendix D.

² Following the extension of fisheries jurisdiction to 200 nautical miles in 1977, the United States began to manage the New England fisheries with a system of individual species quotas and individual vessel-trip limits that was largely inherited from ICNAF and that is similar to the Canadian system. Within two or three years, however, it became apparent that this regulatory approach was unworkable in the New England fisheries. It required predictions of future stock sizes, an assessment of the effects of current fishing upon those stocks, and an allocation among the various user groups that often led to results that were not intended. Beginning in 1978, the United States turned to an alternative form of management of the New England fisheries—one more closely attuned to the distribution and availability of stocks. It relies upon the natural tendency of fishermen to adapt to changes in the relative abundance of the various species in the system. It regulates by restricting the age and size of the fish that may be harvested and the areas and time of that harvest.

365. In brief, the United States and Canada have both developed reasonable but different approaches to the management of east coast fisheries. Nevertheless, the two systems cannot be used simultaneously for the management of Georges Bank stocks. To the extent that they are forced to accommodate each other's practices, one may expect disputes, delays, and impaired conservation.

366. For example, it is doubtful, in light of the experience from the early 1960s to the present, that the scallop stock on Georges Bank can sustain high levels of abundance if it is subject to simultaneous fishing by a Canadian fleet that, by the terms of its licenses, has no other choice but to fish for scallops on offshore banks, and by a United States fleet that is free to switch back and forth between the scallop and other fisheries. If the Georges Bank scallop stock had to be managed jointly, Canada undoubtedly would seek to have the New England fleet limited in a manner similar to that of Canada, especially when the availability of scallops is high. It can be predicted that a United States governmental effort to establish a permanent offshore scallop fleet of limited numbers would be strongly resisted in New England. The United States, in all likelihood, in turn would prefer that Canada allow the Canadian scallop vessels the freedom to leave the Georges Bank scallop fishery for the inshore grounds off the Nova Scotia coast, the offshore groundfishery on the Scotian Shelf or on the Grand Banks of Newfoundland, or elsewhere, particularly when the availability of scallops on Georges Bank is low. This would likely be resisted by Canada, because it would upset the social, political, and economic objectives sought to be balanced by the Canadian fisheries managers.

367. The matter becomes more complicated when all the groundfish and other stocks are considered. Because of their seasonal movement, groundfish would be subjected to heavy fishing pressure on either side of any line splitting Georges Bank. The area and quota approach of Canada, which focuses on the management of a single species, and the flexible approach of the United States, which focuses on the management of the total ecosystem, are fundamentally incompatible ways of managing the fisheries of Georges Bank.

368. The divergent management systems of the Parties have evolved to the point where straightforward solutions to joint-management problems are not foreseeable. This problem exists independent of the will of the Parties; it is intrinsic to the situation. The Canadian line would bring these different systems into direct conflict, because it maximizes the number of stocks subject to joint management. By contrast, the potential for disputes and the risk to conservation are minimized by the adjusted perpendicular line proposed by the United States.

3. *A Boundary Dividing Georges Bank Would Create a Major and Continuing Irritant in the Relations Between the United States and Canada, Because Canada Would Be Entitled to Make Decisions on Oil and Gas Development Affecting the Entire Bank, Without Bearing a Commensurate Risk of Marine Pollution*

369. The United States has demonstrated, at Chapter III of Part I and at Annex 2, that any pollution from hydrocarbon development on the northeastern portion of Georges Bank is not likely to affect significantly the coasts of the Gulf of Maine area, but would spread across the Bank. The impact of such pollution would fall upon the resident stocks of commercially important fish and shellfish, in particular those that spawn on the northeastern portion of Georges Bank and the bottom dwellers whose flesh would be tainted by oil.

370. The Canadian line would allow Canada to authorize and to conduct oil and gas activities on Georges Bank, without bearing the risk that marine pollution resulting from those activities would spread to areas of Canadian interest on the Scotian Shelf. The pollution instead would spread to areas of United States interest. Canada would thereby enjoy the benefits of its decisions without bearing the total risk, whereas the United States would bear a major portion of the risk without any share in the benefits. Any such development would set the stage for serious political disputes between the Parties.

371. The development of the hydrocarbon resources of the continental shelf in environmentally sensitive areas is a delicate matter in both Canada and in the United States. Despite the elaborate procedures under United States law to ensure the prior assessment of the environmental impact of drilling on the continental shelf¹, proposals by the United States federal government to authorize such development are often opposed by local interests and state and local governments. Drilling on Georges Bank has been particularly controversial in the New England states because of the fisheries and recreational interests in the area. In fact, federal programs for hydrocarbon development have been suspended on a number of occasions as a result of lawsuits instituted by state and local governments and other interests². Consequently, the United States

¹ United States Memorial, paras. 94-96.

² Outer Continental Shelf Lease Sale No. 42, involving 123 tracts on Georges Bank, was initially scheduled for 31 January 1978, but was enjoined for over a year as a result of a lawsuit. See United States Memorial, para. 97. Outer Continental Shelf Lease Sale No. 52, also involving parts of Georges Bank, was initially scheduled for 29 March 1983, but has been enjoined by a United States District Court in Massachusetts pending the outcome of further litigation. Outer Continental Shelf Lease Sale No. 76, involving areas east of Long Island, New York, also has been enjoined pending the outcome of further litigation.

has been especially cautious in proceeding with oil and gas development activities on Georges Bank. The drilling that has been conducted by the United States to date was authorized only after special equipment and drilling techniques had been specified for operations in this area¹.

372. Canada and the United States have different procedures for balancing the need for new energy resources and the protection of the environment. The procedures adopted by the United States are more elaborate². Nevertheless, environmental issues have been serious irritants in the relations between the United States and Canada, particularly where one Party has perceived that it bears more of the risk and less of the benefit of development than does the other Party³.

373. If the delimitation of the maritime boundary in the Gulf of Maine area brings any part of Georges Bank under Canadian jurisdiction, it can fairly be predicted that the domestic controversy over drilling in the area will be transformed into a serious international dispute. The adjusted perpendicular line proposed by the United States avoids such a dispute, while the Canadian line in all likelihood would cause it.

SECTION 8. The Canadian Line Disregards State Practice in Geographically Similar Situations

374. As discussed in Part II, an analysis of State practice in geographically similar situations may illuminate the equitable principles that apply in the case before the Court.

375. In the Gulf of Maine area, the land boundary meets the sea in the far corner of a deep coastal concavity. In such a circumstance, an equidistant line would be drawn inward, across the face of the longer United States coast, and would cut off the United States from the areas in front of its coast. There are other boundary situations where the location of the land boundary in relation to a deep coastal concavity would cause an equidistant line to encroach upon the extension of the coastal front of one of the States. Three such boundaries have been delimited by agreement: in the North Sea between the Federal Republic of Germany

¹ United States Memorial, para. 96.

² United States Memorial, paras. 89-101.

³ In recent years, Canada has expressed concerns about transboundary air pollution and about the risks of transporting oil from Alaska along the Pacific coast of Canada. The United States has expressed concerns about the risk of pollution from Canadian drilling in Arctic waters. In the Gulf of Maine area, the United States has objected to Canadian proposals to produce hydroelectric energy by erecting a dam within the Bay of Fundy, and Canada has objected to United States proposals to transport oil into Passamaquoddy Bay to be refined in Maine.

and Denmark, and between the Federal Republic and the Netherlands, and in the Bay of Biscay between France and Spain. In each of these cases, the Parties did not use equidistance for the greater part of the boundary, but used other methods of delimitation that better provided for the seaward extension of their respective coastal fronts.

A. THE NORTH SEA

376. A comparison of boundary situations in the Gulf of Maine area with those in the North Sea reveals both a similarity and a dissimilarity. The areas are similar in that, in both cases, the land boundary meets the sea inside a deep coastal concavity, causing an equidistant line to encroach upon the seaward extension of the coastal front of one of the States. They are dissimilar in that the seaward extent of the maritime jurisdictions of the Federal Republic of Germany, Denmark, and the Netherlands is limited by opposing boundaries with the United Kingdom and Norway¹. Figure 27. In this case, the maritime jurisdiction of the United States and of Canada in the Gulf of Maine area extend seaward into the Atlantic Ocean to the maximum limits of coastal-State jurisdiction.

377. The United States Memorial noted the similarity between the Gulf of Maine area and the boundaries at issue in the *North Sea Continental Shelf* cases:

(38) "The concavity formed in the Gulf of Maine area by the relationship of the New England coast and the Nova Scotia peninsula, together with the convexity of the peninsula itself, causes the equidistant line to swing south across the United States' coastal front. Figure 32. The geographical configuration here resembles the situation in the *North Sea Continental Shelf* cases, where the concavity formed by the Dutch, German, and Danish coasts pulled the equidistant line across the coastal front of the Federal Republic of Germany, encroaching on the seaward extension of that coastline²."

(112) 378. Figure 28 illustrates the similarity. Figure 28A shows how the concavity in the North Sea coast would cause equidistant lines to cut across the coastal front of the Federal Republic and to converge at a point just beyond the hypothetical closing line of the concavity. In order to highlight the resemblance between the concave German coast and the

¹ The Federal Republic of Germany raised no objection to the Danish-Norwegian continental shelf boundary, nor to the British continental shelf as fixed by agreements between the United Kingdom and the Netherlands, and between the United Kingdom and Denmark. *I.C.J. Pleadings, North Sea Continental Shelf* cases, Vol. I, p. 25 (Memorial of the Federal Republic of Germany).

² United States Memorial, para. 310.

- (112) concave United States coast inside the Gulf of Maine, Figure 28B depicts equidistant line boundaries in the Gulf of Maine drawn as if Maine and New Hampshire together constituted a third State located between Massachusetts and Canada. Here again, the coastal concavity causes the equidistant lines to cut across the coastal front of the middle "State" and to converge at a point near the closing line of the concavity.

379. Both examples are graphic testimony to the tendency of an equidistant line, in cases of deep coastal concavities, to emphasize the projecting points on the coast, and not to give effect to the coastlines within the concavities. For example, in Figure 28B, the course of the equidistant line from the closing line seaward is determined entirely by base points on, or seaward of, Seal Island, Nova Scotia, and Cape Cod, Massachusetts. The course is unaffected by the nationality—or even the existence—of the land territory between those points. Under the equidistance method, the course of the boundary through the areas seaward of the closing line would not change regardless of whether Maine-New Hampshire were an independent nation, a part of Canada, a part of the United States, or a part of the ocean. It should be noted that in Figure 28B, the Massachusetts-Canada equidistant line seaward of the closing line replicates the Denmark-Netherlands boundary rejected in the *North Sea Continental Shelf* cases.

380. The comparison of the German coast with the Maine-New Hampshire coast may be carried further. In the *North Sea Continental Shelf* cases, the Federal Republic of Germany presented a diagram depicting the extensions of the Parties' coastal fronts. See Figure 29. This may be compared to Figure 23, which illustrates the seaward extensions of the United States and Canadian coastal fronts. In both cases, equidistance would deny to the middle "State" (Germany and Maine-New Hampshire) large areas that represent the extension of its coastal front. The inequity is greater in the Gulf of Maine because the boundary extends farther seaward.

381. In the North Sea, the Parties avoided the inequities inherent in the equidistance method by limiting the use of equidistant lines. The results of the negotiations are illustrated in Figure 30, which shows the North Sea boundaries as agreed upon after the Court's judgment, together with the equidistant lines¹. Several observations may be made about these agreed boundaries.

¹ Agreement Between the Kingdom of Denmark and the Federal Republic of Germany Concerning the Delimitation, in the Coastal Regions, of the Continental Shelf of the North Sea, signed 9 June 1965; Agreement Between the Federal Republic of Germany and the Kingdom of Denmark Concerning the Delimitation of the Continental Shelf Under the North Sea, signed 28 January 1971; Treaty

382. First, the negotiated boundaries diverge substantially from equidistance. Equidistance is used only in areas close to the coast, out to approximately 23 nautical miles from the Federal Republic-Denmark land boundary terminus and out to approximately 38 nautical miles from the Federal Republic-Netherlands land boundary terminus. As the boundaries proceed farther from the coast, they move farther away from the equidistant lines. This is appropriate in view of the tendency of the equidistant line to become increasingly distorted and inequitable as it extends farther from the coast.

383. A comparison may be made here between the North Sea and the Gulf of Maine area. The distance from the coast of the last equidistant point on the Federal Republic-Denmark boundary is about 15.1 per cent of the distance from the coast to the endpoint of the boundary; in the case of the Federal Republic-Netherlands boundary, this proportion is about 22.6 per cent. Equidistant-line segments of equivalent proportions in the Gulf of Maine area would terminate 43.3 and 64.8 nautical miles, respectively, from the international boundary terminus¹. Figure 31.

384. Second, the negotiated boundaries in the North Sea achieve a reasonable degree of proportionality between the areas to be delimited and the length of the relevant coasts. The proportion of coastal fronts, as calculated by the Federal Republic, is 6 (Federal Republic) to 9 (Denmark) to 9 (the Netherlands). Equidistant lines would have divided the area in a ratio of 6 to 12 to 14. The negotiated boundaries divide the area instead in a ratio of 6 to 7.72 to 9.26.

385. Third, the negotiated boundaries in the North Sea avoid as much as possible cutting off any State from the area situated directly before its coastal front. In the enclosed North Sea, where, as the Federal Republic suggested, the continental shelves of the surrounding States tend to converge in the center of the seabed, it is impossible to accord each State the entire area in front of its coast. The sector lines proposed by the Federal Republic were intended to avoid the cut-off effect that would

(footnote continued from the previous page)

Between the Kingdom of the Netherlands and the Federal Republic of Germany Concerning the Lateral Delimitation of the Continental Shelf in the Vicinity of the Coast, signed 1 December 1964; Treaty Between the Kingdom of the Netherlands and the Federal Republic of Germany Concerning the Delimitation of the Continental Shelf Under the North Sea, signed 28 January 1971. Copies of these agreements may be found in *State Practice in Maritime Delimitation*; materials submitted by Canada on 27 September 1982 pursuant to Article 50(2) of the Rules of Court.

¹ These distances are 15.1 per cent and 22.6 per cent, respectively, of the distance from the international boundary terminus to the point on an equidistant line that is 200 nautical miles from the United States and Canada.

have been caused by drawing equidistant lines from the concave coast¹. The negotiated boundaries closely approximate the sector lines proposed by the Federal Republic. Figure 32.

386. Fourth, the negotiated boundaries in the North Sea take account of the relevant circumstances in the area. Specifically, sharp turns in the boundaries were designed to avoid crossing known oil fields. The detours in these boundaries may be compared with the United States proposal, where adjustments to the perpendicular line enable the boundary to avoid crossing German Bank and Browns Bank, on the Scotian Shelf.

387. There are also significant differences between the North Sea and the Gulf of Maine area. As noted, the area to be delimited in the North Sea was enclosed by opposing boundaries with Norway and the United Kingdom. If Denmark, the Federal Republic of Germany, and the Netherlands faced an open sea, as Canada and the United States face the Atlantic, the negotiated boundaries might well have left even more area to the Federal Republic². Figure 33 compares the maritime area available to Denmark, the Netherlands, and the Federal Republic of Germany to an area extending out to 200 nautical miles, which would have been subject to their jurisdiction if Norway and the United Kingdom did not exist. Figure 33A shows the boundaries that were negotiated, and Figure 33B shows the boundaries that might have been negotiated if the North Sea were an open ocean³.

¹ *I.C.J. Reports 1969*, pp. 20-21, para. 15.

² Indeed, Professor Jaenicke may have been suggesting as much in his oral argument in the *North Sea Continental Shelf* cases:

"If the continental shelf area which is apportioned between the surrounding States has a centre, as in the North Sea, it seems to be legitimate to define the coastal front of these States as the line which represents the breadth of its coast facing the centre. If we had no centre, we would have to take the general direction of the coastline of these States facing the continental shelf area which is to be distributed." *I.C.J. Pleadings, North Sea Continental Shelf*, Vol. II, p. 188.

³ The hypothetical boundaries in such a case would be consistent with the Court's opinion:

"[I]n the present case there are three States whose North Sea coastlines are in fact comparable in length and which, therefore, have been given broadly equal treatment by nature except that the configuration of one of the coastlines would, if the equidistance method is used, deny to one of these states treatment equal or comparable to that given the other two.... What is unacceptable in this instance is that a State should enjoy continental shelf rights considerably different from those of its neighbors merely because in the one case the coastline is roughly convex in form and in the other it is markedly concave, although those coastlines are comparable in length." *I.C.J. Reports 1969*, p. 50, para. 91.

B. THE BAY OF BISCAY

388. Among previously delimited maritime boundaries, the area that geographically is most like the Gulf of Maine area is the Bay of Biscay. In both cases, the land boundary between two adjacent States reaches the sea in the far corner of a large coastal concavity. Figure 34. In both cases, the concavity is roughly three-sided, with one side belonging to one State (Spain/Canada) and the other two sides belonging to the other State (France/United States). In both cases, the concavity would cause an equidistant line to be pulled inward across the coastal front of the State with the longer coast (France/United States).

389. There are also differences between the two cases. For example, the proportions of the sides of the respective coasts are not identical. The seaward-facing side of the Bay of Biscay, the French coast from the land boundary to Pointe de la Negade, is proportionately shorter than the corresponding coastal front in the Gulf of Maine, the Maine-New Hampshire coastline. Similarly, the inward-facing sides of the Bay of Biscay are proportionately longer than the corresponding sides of the Gulf of Maine. The Spanish coastal front facing into the Bay of Biscay constitutes a large part of the Bay of Biscay coastline. In comparison, the corresponding Canadian coastal front that faces the Gulf of Maine, including a closing line across the mouth of the Bay of Fundy, constitutes only a small part of the Gulf of Maine coastline. Finally, in the Bay of Biscay, there are no geomorphological features of a significance equivalent to that of the Northeast Channel, Georges Bank, and the fishing banks on the Scotian Shelf.

390. France and Spain have established a continental shelf boundary in the Bay of Biscay¹. Figure 35. It should be noted that this is not a single maritime boundary, and that the boundary extends only to the closing line across the mouth of the Bay of Biscay, from Cabo Ortegal (Spain) to Pointe du Raz (France), and not to the outer limit of coastal-State jurisdiction. Nevertheless, it is instructive to review the results of the Bay of Biscay delimitation, and to note aspects relevant to the Gulf of Maine area².

391. First, the equidistance method was used in the Bay of Biscay—as in the North Sea boundaries—to delimit only the areas close to the shore. The boundary follows the equidistant line to Point R, approximately 108 nautical miles from the terminus of the land boundary. By contrast, the

¹ Convention Between France and Spain on the Delimitation of the Continental Shelves of the Two States in the Bay of Biscay, 29 January 1974. See *Limits in the Seas*, United States Memorial, Annex 78, Vol. IV.

² Annex 10, Vol. IV, presents a detailed analysis of the methods of delimitation used in the Bay of Biscay.

point at which an equidistant line would intersect the closing line is about 244 nautical miles from the land boundary terminus. Thus, the equidistant line extends only 44 per cent of the distance from the land boundary to the closing line. An equidistant line of the same proportion drawn from the international boundary terminus in the Gulf of Maine would terminate approximately 66 nautical miles from the international boundary terminus¹. Figure 36. This point is 1.4 nautical miles from the endpoint of the hypothetical equidistant line segment, depicted at Figure 31, which was determined by analogy with the continental shelf boundary between the Federal Republic of Germany and the Netherlands.

392. As the Bay of Biscay boundary proceeds seaward, it diverges increasingly from an extension of the equidistant line. Figure 37. This is important in light of Canada's contentions that, at the mouth of the Gulf of Maine, the United States and Canada are opposite States, and that equidistance would therefore be equitable. The Canadian argument focuses on the relationship between Nova Scotia and Massachusetts but ignores the important Maine-New Hampshire coastline, which is adjacent to Canada both within and beyond the Gulf of Maine. It also ignores the fact that the Nova Scotia and Massachusetts coasts are geographically adjacent in relation to the areas seaward of the Gulf of Maine, just as the coasts of the United Kingdom and France are geographically adjacent in relation to the Atlantic region. At the Bay of Biscay closing line, where, according to Canada's analysis, the Parties might be considered to be most opposite, the boundary is most distant from the equidistant line. In fact, Point T is almost 60 nautical miles closer to Spain than it is to France. In this manner, the Bay of Biscay boundary reflects the importance of the French coastal front facing the Atlantic, its adjacent relationship to the Spanish coast, and the location of the land frontier.

393. Second, the boundary in the Bay of Biscay achieves a reasonable degree of proportionality between the lengths of the respective coastlines and the area to be delimited. As measured along the simplified coastlines used by France and Spain in the negotiations, the lengths of the respective coastlines are 267 nautical miles for Spain and 349 nautical miles for France, a ratio of 1 to 1.29². In the area of the Bay seaward of the artificial coastlines, the boundary leaves 18,864 square nautical miles to Spain and 26,463 square nautical miles to France, a ratio of 1 to 1.40. By

¹ This distance is 44 per cent of the distance from the international boundary terminus to the point of intersection of an equidistant line with the Nantucket Island-Cape Sable closing line across the Gulf of Maine.

² See Annex 10, Vol. IV.

contrast, an equidistant line would have delimited the area in a proportion of 1 to 1.03¹.

394. The third and perhaps most important point relevant to the delimitation of the Gulf of Maine area concerns the manner in which the Bay of Biscay boundary respects the coastal fronts of France and Spain. The Spanish coastal front from the land boundary terminus to Cabo Ortegal faces north onto the Bay of Biscay in much the same manner as the short Nova Scotia coast faces southwest onto the Gulf of Maine. Since the coastal concavity in the Bay of Biscay would cause an equidistant line to swing too far north across the face of the longer French coast, the negotiated boundary limits the northward extension of the Spanish coastal front into the Bay of Biscay. Similarly, an equitable solution in the Gulf of Maine area would limit the extension of the southwestern-facing secondary Nova Scotia coastal front.

395. The Bay of Biscay boundary avoids encroachment upon the extension of the Spanish coast by following the equidistant line seaward only to Point R. Once it is clear of the coast, however, the boundary turns westward and seaward. From Point R to Point T it proceeds roughly parallel to the Spanish coastal front. This line resembles the adjusted perpendicular line proposed by the United States, which begins approximately 39 nautical miles from the international boundary terminus, a point that is already 32 nautical miles from the secondary Canadian coastal front², and which, except for the detours taken to avoid crossing the fishing banks on the Scotian Shelf, runs parallel to the southwest Nova Scotia coastal front. Figure 38.

396. The Bay of Biscay boundary may be compared with a line perpendicular to the general direction of the coast. If the closing line from Cabo Ortegal to Pointe du Raz represents the general direction of the coast in the vicinity of the Bay of Biscay, then a perpendicular to the general direction of the coast, drawn from Point Q, intersects the closing line close to Point T. Figure 39. The boundary crosses north of the perpendicular line throughout the length of the Spanish coastal front, but turns back to the perpendicular line at the seaward limit of that coastal front. Although the Bay of Biscay boundary seaward of the closing line has not

¹ Of the entire area of the Bay, including the areas landward of the artificial coastlines, the boundary allocates 20,086 square nautical miles to Spain and 29,427 square nautical miles to France, for a ratio of 1 to 1.47. An equidistant line would divide this area in a ratio of 1 to 1.11. It may also be noted that the distances between Point T and Cabo Ortegal, and between Point T and Pointe du Raz are proportional to the respective lengths of the simplified coastlines. See Annex 10, para.

² This calculation assumes that Canada's southwestern-facing secondary coastal front is represented by a line drawn between the international boundary terminus and Cape Sable.

been delimited, the location of Point T may suggest how to treat a coast, such as the Spanish coast on the Bay of Biscay or the Nova Scotia coast on the Gulf of Maine, that faces into a deep coastal concavity. In such cases, the coastal front may be extended to a modest degree across the face of the adjacent coast, i.e., beyond the perpendicular to the general direction of the coast—but only inside, and not outside, the coastal concavity.

C. CONCLUSIONS MAY BE DRAWN FROM THE PRACTICE OF STATES IN GEOGRAPHICAL SITUATIONS SIMILAR TO THE GULF OF MAINE AREA

397. *The North Sea and Bay of Biscay boundaries exemplify several principles that apply as well to the Gulf of Maine area. These principles concern the equidistance method, proportionality, and coastal fronts.*

398. First, the Parties to the agreements in the North Sea and Bay of Biscay rejected boundary delimitations based upon the equidistance method. Each of the three boundaries diverges substantially from the equidistant line, to the advantage of the Party that would have been “cut off” from the areas in front of its coast by the tendency of the concavity to pull an equidistant line inward (the Federal Republic of Germany and France).

114 117 399. In each case, the Parties used equidistance only to delimit the inshore areas. As is illustrated in Figures 31 and 36, an equidistant line of comparative proportions in the Gulf of Maine area would terminate well inside the Gulf.

400. In each case, the distance between the agreed boundary and the equidistant line grows larger as the boundary extends seaward. This is consistent with the observation that the *distorting effects of coastal irregularities upon equidistant lines magnify as the lines depart the coast.* Similarly, an equidistant line boundary in the Gulf of Maine area would become increasingly inequitable if it were extended seaward through the Gulf and beyond.

401. Canada has claimed that the United States and Canadian coasts are opposite in the area between Cape Sable and Cape Cod, and has used this claim to support the use of equidistance in that area. As noted above, *the Bay of Biscay boundary is most divergent from the equidistant line at the point where, under Canada’s analysis, France and Spain would be most nearly opposite.*

402. Inasmuch as Canada attempts to buttress its argument with vague references to the *Tunisia/Libya* case¹, an examination of that boundary is appropriate here. Although no coastal concavity affects the course of an equidistant line in that area, the change in direction of the Tunisian coast

¹ Canadian Memorial, paras. 343, 363, and 364.

(119) forms a convexity that would cause an equidistant line to swing outward across the coast of Libya, much as a concavity pulls an equidistant line inward. The direction of the boundary specified by the Court was modified to reflect the change in direction of the coast, and the new direction was parallel to a constructed coastline. That boundary, however, does not approach the equidistant line, either at the point where the boundary changes direction or seaward of that point. On the contrary, the boundary at the point where it changes direction is about 13 nautical miles northwest of the equidistant line and—like the North Sea and Bay of Biscay boundaries—diverges increasingly, up to 25 nautical miles, from the equidistant line as it extends seaward. Figure 40. Thus, the *Tunisia/Libya* boundary specified by the Court confirms that inequities in an equidistant line are magnified as the line moves farther from the coast¹.

403. The second principle illustrated by the Bay of Biscay and North Sea boundaries is that proportionality is useful as a guide to the equitable character of a given delimitation, particularly in cases where the boundary meets the sea inside a large coastal concavity. All three boundaries in the Bay of Biscay and the North Sea delimit the offshore areas in close proportion to the ratio of the lengths of the coastal fronts. As demonstrated in the United States Memorial and Counter-Memorial, the adjusted perpendicular line achieves a reasonable degree of proportionality in the Gulf of Maine area, while the equidistant line, and, *a fortiori*, the Canadian line, would not.

404. Third, the three negotiated boundaries exemplify the principle that a boundary should not cut off the seaward extension of the parties' coastal fronts. In particular, the boundaries illustrate the manner in which coastal fronts should be extended in situations where the land boundary meets the sea within a deep coastal concavity. Each of the three negotiated boundaries limits the extension into the concavity of the

¹ It is important to distinguish the fact that the inequities in an equidistant line are magnified as the line moves farther from the coast, from the comment in the *Tunisia/Libya* case that "a line drawn perpendicular to the coast becomes, generally speaking, the less suitable as a line of delimitation the further it extends from the coast." *I.C.J. Reports* 1982, pp. 87-88, para. 125. The Court's statement is correct in the geographical context of the *Tunisia/Libya* case. There, the perpendicular to the coast produces an equitable result in the areas nearest the coast, but, because the Tunisian coast changes direction in the Gulf of Gabes, such a line requires adjustment in the more distant areas. In the Gulf of Maine area, by contrast, the changes in direction of Canada's coast cause the Nova Scotia peninsula to protrude south of the international boundary terminus, and produce the short secondary Canadian coastline, inside the Gulf of Maine, that lies at a right angle to the general direction of the coast. As a result, a line perpendicular to the general direction of the coast is an equitable boundary in the areas close to the international boundary terminus, and in the areas seaward of the Gulf of Maine, but may require adjustment in the vicinity of the southwestern tip of the Nova Scotia peninsula.

coastal front on the lateral sides of the concavity (Netherlands, Denmark, Spain) in order to avoid cutting off the coastal front of the adjacent State (Germany, France) from the area situated directly before it. In other words, each boundary allows the seaward extension of the primary coastal front of the State (Germany, France) at the back or middle of the concavity.

(118) 405. In the North Sea, the boundaries allow the coastal fronts of the three States to extend toward the center of the North Sea. Thus, the coastal fronts of Denmark and the Netherlands do not cut off the seaward extension of the German coastal front. Similarly, the Bay of Biscay boundary allocates to each Party most of the area seaward of its coast, as reflected by the line perpendicular to the closing line. Figure 39. In particular, this boundary avoids cutting off the French coast at the back or middle of the concavity (from the land boundary to Pointe de la Negade) from its extension into the Atlantic. The Spanish coastal front extends only a modest distance laterally within the Bay, north of the perpendicular to the closing line; it does not swing as far north across the French coastal front as would an equidistant line. Indeed, at Point T on the closing line, the boundary, as previously noted, nearly intersects the perpendicular to the closing line.

406. The principle that the boundary must not cut off the Parties from the areas situated directly before their coastal fronts confirms the equitable character of the boundary proposed by the United States. The short inward-facing Nova Scotia coast is afforded a generous lateral extension, but is limited in order to reduce the degree to which Maine and New Hampshire are cut off from the areas directly seaward of their coastline; and, the primary coastal fronts, i.e., the long eastern coast of Nova Scotia and the Maine and New Hampshire coasts, which face the Atlantic Ocean, are permitted to extend into the Atlantic to the maximum limits of coastal-State jurisdiction¹.

407. Thus, an analysis of the State practice in geographical situations similar to the Gulf of Maine area shows that: (1) the adjusted perpendicular line proposed by the United States is consistent with principles underlying the practice of other States in similar geographic circumstances, i.e., where the land boundary meets the sea in a corner of a large coastal concavity; and (2) the Canadian line is inconsistent with the practice of States in such circumstances.

¹ See United States Memorial, paras. 307-309.

CHAPTER IV

SUMMARY OF THE APPLICATION OF THE LAW TO THE FACTS

408. In this Part, the United States has applied the law as set forth in Part II to the facts of this case, as set forth in Part I.

409. In so doing, the United States has established that it is not barred from contesting the Canadian claim to the northeastern portion of Georges Bank by the doctrines of acquiescence and estoppel. In the first instance, the conduct relied upon by Canada is neither a clear and unambiguous assertion of rights by Canada nor a clear and unambiguous consent to that assertion by the United States. Second, the United States government employees upon whose conduct Canada's allegations of acquiescence and estoppel rest, did not have the express or apparent authority to bind the United States. Third, the United States made a timely protest of Canada's non-notorious issuance of oil and gas permits on the northeastern portion of Georges Bank. Fourth, Canada did not rely to its detriment on United States actions. Finally, the entire Canadian claim of acquiescence and estoppel relies upon continental shelf activities and ignores completely the fisheries dimension of the dispute.

410. The United States has established further that Canada's proposed boundary is based upon a number of misapplications of the law to the facts:

a. Canada's line ignores the central significance to this case of the location of the international land boundary within a deep coastal concavity in the far northern corner of the Gulf of Maine.

b. The Canadian line would cut off the extension seaward from the states of Maine and New Hampshire of the primary coastal front of the United States into and under the sea, contrary to the basic legal principle that the land dominates the sea. The Canadian line would give exaggerated and inequitable effect to the short southwestern-facing coast of Nova Scotia that (a) is aberrant to the general geographical relationship between the Parties, because it lies perpendicular to the general direction of the coast, and (b) is south of the international boundary terminus.

c. The Canadian line would not result in a reasonable degree of proportionality between the respective lengths of the Canadian and United States coasts and the area to be delimited, whereas the boundary proposed by the United States does so.

d. The Canadian line would cut across Georges Bank well southwest of the Northeast Channel, splitting the separate and identifiable ecological regime of the Bank, and most of the important commercial stocks of fish and shellfish that are found there. The Canadian line would not give effect to the Northeast Channel as a significant geomorphological feature and as the natural boundary between Georges Bank and the Scotian Shelf.

e. The Canadian line disregards the conduct of the Parties and their nationals:

(1) The Canadian line is not supported by Canada's limited and recent fishing activity on Georges Bank which is related principally to one fishery—scallops, which only began in 1954, and which only became significant in the early 1960's. This Canadian activity is to be compared to over 150 years of United States fishing in the same area, in virtually every fishery, and, until 1954, conducted almost exclusively by United States fishermen. The Canadian line, moreover, disregards fishing on Georges Bank by United States nationals from Maine and New Hampshire who have fished on Georges Bank in the past and who do so today. It also ignores the consistent United States fishing activities on the northeastern portion of the Bank.

(2) The United States has done all the charting and surveying, conducted most of the scientific research, and has been primarily responsible for the defense and search and rescue operations in the area of Georges Bank and the Gulf of Maine Basin. Lines used by the Parties in relation to these activities show that they have consistently divided responsibility at or near the Northeast Channel, and never in the middle of Georges Bank.

(3) Finally, the Canadian line is not supported by the content of the failed and legally irrelevant 1979 east coast fisheries agreement, which would have established a comprehensive joint-management system governing fishing activity from Newfoundland to North Carolina. The Canadian argument for awarding Canada a share of Georges Bank based on this rejected and unratified treaty would penalize the United States for engaging in good-faith negotiations.

f. As established in Part II, considerations of purported economic dependence and relative wealth, upon which Canada relies to support its line, are complex, variable, and unpredictable, and are legally irrelevant in a maritime boundary delimitation. Even if they were legally relevant, however, an analysis of Canada's socio-economic arguments, set forth in Annex 4 to this Counter-Memoriam, shows that the adjusted perpendicular line proposed by the United States is an equitable solution. Canada's

socio-economic arguments are incomplete and misleading, and rely upon unrepresentative statistics that exaggerate the importance of Canadian fishing on Georges Bank to Canada. Moreover, the strength and diversity of the Nova Scotia economy and its ability to adjust to any effects resulting from confirmation of United States jurisdiction over Georges Bank are understated.

g. The Canadian line, by cutting across Georges Bank, would disregard the equitable principles that the boundary should facilitate resource conservation and management and should minimize the potential for international disputes:

(1) The Canadian line would divide commercially important stocks of fish and shellfish found on Georges Bank. As a result, those stocks would become common-pool resources, permanently subject to the uncertainty and disadvantages of joint management, and would bring into direct conflict the incompatible national fishing policies of the Parties.

(2) The Canadian line, by permitting Canadian hydrocarbon development on Georges Bank, would create a major and continuing irritant in the political relations between the Parties. Canada might make decisions on oil and gas development that could create a risk of pollution that could affect all of Georges Bank, without bearing a significant risk that such pollution would spread to areas of Canadian interest on the Scotian Shelf.

h. The Canadian line would disregard State practice in the geographically similar situations in the North Sea and Bay of Biscay. In these situations, the Parties did not use the equidistance method for the greater part of the boundaries, but used other methods that more effectively provided for the seaward extension of their respective coastal fronts. Furthermore, these negotiated boundaries delimited the offshore areas in proportion to the ratios of the respective lengths of coastal fronts.

411. The United States, in this Counter-Memorial, reaffirms the conclusion of its Memorial that the line perpendicular to the general direction of the coast in the Gulf of Maine area, as adjusted to respect two fishing banks on the Scotian Shelf, is in accordance with equitable principles, and takes account of the relevant circumstances in the area, to produce an equitable solution in this case. The Canadian line would satisfy none of these requirements of the Fundamental Rule, and would result in an inequitable solution. Accordingly, the United States reaffirms the submissions set forth in its Memorial.

SUBMISSIONS

In view of the facts set forth in Part I of the United States Memorial and this Counter-Memorial, the statement of the law contained in Part II of the United States Memorial and this Counter-Memorial, and the application of the law to the facts as stated in Part III of the United States Memorial and of this Counter-Memorial;

Considering that the Special Agreement between the Parties requests the Court, in accordance with the principles and rules of international law applicable in the matter as between the Parties, to decide the course of the single maritime boundary that divides the continental shelf and fisheries zones of the United States of America and Canada from a point in latitude $44^{\circ}11'12''\text{N}$, longitude $67^{\circ}16'46''\text{W}$ to a point to be determined by this Court within an area bounded by straight lines connecting the following sets of coordinates: latitude 40°N , longitude 67°W ; latitude 40°N , longitude 65°W ; latitude 42°N , longitude 65°W ;

May it please the Court, on behalf of the United States of America, to adjudge and declare:

A. Concerning the Applicable Law

1. That delimitation of a single maritime boundary requires the application of equitable principles, taking into account the relevant circumstances in the area, to produce an equitable solution;
2. That the equitable principles to be applied in this case include:
 - a) The principles that the delimitation respect the relationship between the relevant coasts of the Parties and the maritime areas lying in front of those coasts, including nonencroachment, proportionality, and, where appropriate, natural prolongation;
 - b) The principle that the delimitation facilitate conservation and management of the natural resources of the area;
 - c) The principle that the delimitation minimize the potential for disputes between the Parties; and
 - d) The principle that the delimitation take account of the relevant circumstances in the area;
3. That the equidistance method is not obligatory on the Parties or preferred, either by treaty or as a rule of customary international law, and that any method or combination of methods of delimitation may be used that produces an equitable solution.

B. Concerning the Relevant Circumstances to be Taken into Account

1. That the relevant geographical circumstances in the area include:
 - a) The broad geographical relationship of the Parties as adjacent States;
 - b) The general northeastern direction of the east coast of North America, both within the Gulf of Maine and seaward of the Gulf;
 - c) The location of the international boundary terminus in the northern corner of the Gulf of Maine;
 - d) The radical changes in the direction of the Canadian coast beginning at the *Chignecto Isthmus*, 147 miles northeast of the international boundary terminus;
 - e) The protrusion of the Nova Scotia peninsula 100 nautical miles southeast of the international boundary terminus, creating a short Canadian coastline perpendicular to the general direction of the coast, and across from the international boundary terminus;
 - f) The concavity in the coast created by the combination of the protrusion of the Nova Scotia peninsula and the curvature of the New England coast;
 - g) The relative length of the relevant coastlines of the Parties; and
 - h) The Northeast Channel, Georges Bank, and Browns Bank and German Bank on the Scotian Shelf, as special features;
2. That the relevant environmental circumstances in the area include:
 - a) The three separate and identifiable ecological regimes associated, respectively, with the Gulf of Maine Basin, Georges Bank, and the Scotian Shelf; and
 - b) The Northeast Channel as the natural boundary dividing not only separate and identifiable ecological regimes of Georges Bank and the Scotian Shelf, but also most of the commercially important fish stocks associated with each such regime;
3. That the relevant circumstances in the area relating to the predominant interest of the United States as evidenced by the activities of the Parties and their nationals include:
 - a) The longer and larger extent of fishing by United States fishermen since before the United States became an independent country;

- b) The sole development, and, until recently, the almost exclusive domination of the Georges Bank fisheries by United States fishermen; and
- c) The exercise by the United States and its nationals for more than 200 years of the responsibility for aids to navigation, search and rescue, defense, scientific research, and fisheries conservation and management.

C. Concerning the Delimitation

1. That the application of equitable principles taking into account the relevant circumstances in the area to produce an equitable solution is best accomplished by a single maritime boundary that is perpendicular to the general direction of the coast in the Gulf of Maine area, commencing at the starting point for delimitation specified in Article II of the Special Agreement and proceeding into the triangle described in that Article, but adjusted during its course to avoid dividing German Bank and Browns Bank, both of which would be left in their entirety to Canada;
2. That the boundary should consist of geodetic lines connecting the following geographic coordinates:

<u>Latitude (North)</u>	<u>Longitude (West)</u>
a.) 44°11'12"	67°16'46"
b.) 43°29'06"	66°34'30"
c.) 43°19'30"	66°52'45"
d.) 43°00'00"	66°33'21"
e.) 42°57'13"	66°38'36"
f.) 42°28'48"	66°10'25"
g.) 42°34'24"	66°00'00"
h.) 42°15'45"	65°41'33"
i.) 42°22'23"	65°29'12"
j.) 41°56'21"	65°03'48"
k.) 41°58'24"	65°00'00"

(Signed) _____

DAVIS R. ROBINSON
Agent of the United States
of America

**ANNEXES TO THE COUNTER-MEMORIAL
OF THE UNITED STATES OF AMERICA**

Volume I. Part A

Annex 1

THE MARINE ENVIRONMENT OF THE GULF OF MAINE AREA*

PREFACE

This Annex describes the marine environment of the Gulf of Maine area. It consists of three Chapters. Chapter I describes the physical oceanography of the area and its division into three separate and identifiable oceanographic regimes, each with distinct characteristics in terms of the origins of the waters, water circulation patterns, temperature, salinity, and the degree to which the waters are mixed vertically. Chapter II describes how the marine life, or ecology, of the area corresponds to the oceanographic regimes described in Chapter I. Thus, in the Gulf of Maine area, there are three separate and identifiable ecological regimes characterized by distinct communities of plants, microscopic herbivorous organisms, fish, and shellfish. Chapter III describes the significant role that the Northeast Channel plays in the formation of the separate ecological regimes of the Gulf of Maine Basin and of Georges Bank.

*Prepared on the basis of contributions from Dr. Robert L. Edwards, Special Assistant to the Assistant Administrator of Fisheries, National Oceanic and Atmospheric Administration (N.O.A.A.); Dr. Bradford E. Brown, Dr. Marvin D. Grosslein, Dr. Kenneth Sherman, and the staff of the Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., United States Department of Commerce.

INTRODUCTION

1. The Gulf of Maine area lies in the northwest sector of the Atlantic Ocean. Its latitude corresponds roughly to that of the northern coasts of Portugal and Spain and the southern part of the Bay of Biscay. The Gulf of Maine¹ is an unusually large embayment, open on its southeastern border to the ocean, and bordered on the south, west, and northwest by the New England states and on the northeast by the entrance to the Bay of Fundy and by the tip of the Nova Scotia peninsula. Figure 1². The land boundary between the United States and Canada meets the sea in the far northern corner of the Gulf of Maine.

2. The marine environment of the Gulf of Maine area varies dramatically. First, the topography of the continental shelf undergoes marked changes in the region. Second, the major ocean currents, the Labrador Current and the Gulf Stream, converge on the area from the north and south. Third, cold dry air from the arctic regions, mild dry air from the west, and warm moist air from the south all converge in the Gulf of Maine area. Because of the diverse topography and the confluence of major ocean currents and atmospheric conditions, the oceanic environment of the area is variegated and undergoes profound seasonal changes. As a result of these differences in the ocean environment, the ecology of the region, in turn, is especially diversified and compartmented.

3. Fishery resources are part of the ecology of the Gulf of Maine area. In order to understand this ecology, various physical processes must be reviewed, beginning with the influence of the topography upon the movement of water. The following review of this and other factors explains the distribution and abundance of the living resources, and the development of separate marine communities, within the Gulf of Maine area.

¹ In this Annex, as in the United States Memorial [para. 25, n. 2] and the United States Counter-Memorial [para. 16, n. 2], "Gulf of Maine" refers to the seabed and body of water landward of a hypothetical line between Nantucket Island and Cape Sable. It does not include the Bay of Fundy. "Gulf of Maine Basin" refers to the Gulf of Maine, except for that part of the Scotian Shelf and superjacent waters that are in the Gulf of Maine. The "Gulf of Maine area" refers to the broader area described in the United States Memorial, para. 25.

² Figure 1. Photograph of a globe made by Rand-McNally, Inc. © Rand-McNally & Co. R.L. 83-GP-2.

CHAPTER I

PHYSICAL OCEANOGRAPHY OF THE GULF OF MAINE AREA

SECTION 1. The Gulf of Maine Basin, Georges Bank, and the Scotian Shelf are Topographically Different from One Another

4. The comparatively opaque surface of the ocean obscures the fact that the topography of the seabed is as varied as is that found on land. The seabed, including deep channels and shallow banks, is unusually diversified in the Gulf of Maine area. As on land, such features influence the surrounding environment. In the marine environment, they are particularly important in the development of water circulation patterns and hydrographic fronts¹.

5. As is shown in Figure 2², the continental shelf from the northeastern tip of Georges Bank southwest to Cape Hatteras and beyond is a continuous undersea plain. Georges Bank and the southern New England shelf descend gently seaward from the coast to the edge of the continental shelf. While the southern New England shelf is bordered on the north by land, Georges Bank is limited to the north by the Gulf of Maine Basin³ and to the northeast by the Northeast Channel. There is little other topographic difference between Georges Bank and the southern New England shelf⁴. In marked distinction to the topography of the southern New England shelf and Georges Bank, the Scotian Shelf is deep and rough-hewn inshore, and offshore is a series of scattered banks with superjacent waters that are not as shallow as those above Georges Bank.

6. The Gulf of Maine Basin is a large marine cul-de-sac, a bowl surrounded by Georges Bank; the coasts of Massachusetts, New Hampshire, and Maine; the entrance to the Bay of Fundy; and the southwestern tip of the Scotian Shelf. The shape of the Gulf of Maine Basin is illustrated in

¹ United States Memorial, para. 46: "Marked fronts exist where bodies of water with differing temperature, salinity, density, and other characteristics come together. These fronts are similar to the familiar weather fronts that separate cold air masses from warm air masses."

² Figure 2. Three-dimensional illustration, produced by the Information Systems Division of the United States Geological Survey (Flagstaff, Arizona), using the bathymetric data base described in Appendix K.

³ *Supra* para. 1, n. 1.

⁴ See Annex 5, Vol. IV, The Geomorphology and Geology of the Gulf of Maine Area, and Figure 2 therein.

Figure 3¹. The Gulf of Maine Basin has an average depth of approximately 150 meters, and contains three relatively isolated deeper basins, Georges Basin, Jordan Basin, and Wilkinson Basin, with depths of 380 meters, 280 meters, and 300 meters, respectively. Figures 4 and 5². As is illustrated in Figure 3, the Gulf of Maine Basin, in its eastern corner, has a direct and deep access to the Atlantic Ocean through the Northeast Channel³.

7. In the Gulf of Maine area, the outer edge of the continental shelf has a slope of one per cent or more. A slope of one per cent is significant in determining the direction of currents. It also affects the presence of gyres and the development and persistence of distinctive water masses. Slopes of different degrees in the Gulf of Maine area are shown in Figure 6⁴. Slopes of greater than one per cent are indicated in brown. Slopes of between 0.5 per cent and one per cent are indicated in orange; lesser slopes are indicated in lighter orange and yellow. The southern edge of the Gulf of Maine Basin (the northern edge of Georges Bank) and its western edge are highlighted in brown, indicating that a slope of one per cent or more is found along these edges. Figure 6 confirms that Georges Bank is an extension of the southern New England continental shelf. Figure 6 also shows that the Northeast Channel has steep slopes on both of its sides, and that the Northeast Channel is the only major break across the continental shelf in the Gulf of Maine area⁵. To the northeast of the Northeast Channel, the topography is different: the outer edge of the Scotian Shelf is relatively flat (shown in Figure 6 in white and, occasionally, yellow) just prior to its descent into the ocean depths, but is deeper inshore.

¹ Figure 3. View of the topography of the continental shelf from Cape Charles, Virginia, to the northeastern end of Nova Scotia, from 135 degrees, with 25-degree tilt from the vertical. Three-dimensional illustration, produced by the Information Systems Division of the United States Geological Survey (Flagstaff, Arizona), using the bathymetric data base described in Appendix K.

² Figure 4. Bathymetry of Gulf of Maine Area—longitudinal cross-sections, based upon the bathymetric data base described in Appendix K. Figure 5. Bathymetry of Gulf of Maine Area—latitudinal cross-sections, based upon the bathymetric data base described in Appendix K. Note that the shape of Georges Bank is similar to the shape of the southern New England shelf.

³ The Northeast Channel has a "sill depth" of about 235 meters. The sill depth is that of the Northeast Channel at its shallowest. The threshold created by the shallowest point of the Northeast Channel limits the depth at which water can pass directly from the Atlantic Ocean into the Gulf of Maine Basin.

⁴ Figure 6. Seabed gradients, based upon the bathymetric data base described in Appendix K.

⁵ The only other break of any significance across the continental shelf is not shown in Figure 6. It is the Laurentian Channel, located farther to the northeast, beyond the Gulf of Maine area.

8. In summary, Georges Bank and the Scotian Shelf are topographically different from each other. The Gulf of Maine Basin is also distinctive, a large depression surrounded on three sides by the continental landmass, and on the fourth by the continental shelf (Georges Bank and the tip of the Scotian Shelf). The other major topographic feature of the area, the Northeast Channel, is crucial to the development of the marine environment and the separate and identifiable ecological regimes of the area. The Northeast Channel divides the Georges Bank regime from the Scotian Shelf regime, and is the gateway through which deep (greater than 200 meters) oceanic water enters the Gulf of Maine Basin. See Figure 3.

SECTION 2. The Gulf of Maine Area Is Divided Into Three Separate and Identifiable Oceanographic Regimes

9. The principal oceanic and atmospheric systems affecting the Gulf of Maine area are well established¹. The uniqueness of the Gulf of Maine area results from the confluence there of waters of different character. Figure 7² identifies the major current systems that influence the marine environment of the Northwest Atlantic. Cold arctic water is brought into the Gulf of Maine area by the Labrador Current. The Gulf Stream brings in water from the tropics that is warmer and more saline. The water over the continental slope forms a coherent water mass between the water over the continental shelf and the water in the Gulf Stream, and is different from each. This continental slope water is primarily an amalgam of these other two waters. It rotates gently, in a clockwise direction, from Cape Hatteras to the Grand Banks and back to the Cape. As will be described below, there is an infusion of water from the continental slope (along the shelf edge) into the Gulf of Maine Basin through the Northeast Channel. This infusion plays a critical role in the development of the separate and identifiable oceanographic regimes in the Gulf of Maine area.

10. Within the Gulf of Maine area, three principal physical oceanographic³ regimes are formed as a consequence of the topography and the water circulation pattern. These three separate and identifiable regimes

¹ See H.B. Bigelow, "Physical Oceanography of the Gulf of Maine", in United States Bureau of Fisheries, *Bulletin*, Vol. XL, Part 2 (Document 969), 1927, pp. 513 *et seq.* Cited in United States Memorial, para. 38, n. 1; materials previously deposited with the Court pursuant to Article 50(2) of the Rules of Court; H.J. McLellan, "On the Distinctness and Origin of the Slope Water off the Scotian Shelf and its Easterly Flow South of the Grand Banks", in *Journal of the Fisheries Research Board of Canada*, Vol. 14, No. 2, 1957, pp. 213-239.

² Figure 7. The principal water masses and currents affecting the Gulf of Maine area, overlaid on Rand-McNally, Inc., globe shown in Figure 1. © Rand-McNally & Co. R.L. 83-GP-2.

³ The term "oceanographic" is used in this Annex to indicate the physical properties of the marine environment, including the physical boundaries of the sea and the chemistry and physics of the sea water. The term "ecological" is used with reference to the marine biology that inhabits the ocean.

are found over the Scotian Shelf, in the Gulf of Maine Basin, and over Georges Bank¹. Each of these three regimes is distinct from the others in the origins of its waters; in its physical characteristics, including salinity and temperature²; and in the dominant mixing forces to which it is subjected. A summary of the differences among the three regimes appears in Table A. These characteristics contribute to the development of fronts, where the regimes confront one another with varying degrees of interaction³. In the Gulf of Maine area, such fronts occur between the tempered, deeper waters of the Gulf of Maine Basin and those of the shallow, well-mixed waters of the Georges Bank regime⁴, and also between the waters of the Gulf of Maine Basin and the very cold, less saline waters of the Scotian Shelf. The differences in the physical characteristics of the three regimes are largely responsible for the development of separate and identifiable marine communities within each of the three regimes and, in particular, for the presence and distribution of the fish species and stocks upon which the commercial fisheries of the area depend.

A. THE DIFFERENT ORIGINS OF THEIR WATERS DISTINGUISH THE THREE SEPARATE AND IDENTIFIABLE OCEANOGRAPHIC REGIMES

11. The water over the Scotian Shelf comes principally from the Labrador Current and the Gulf of St. Lawrence. Fresh water enters the Scotian Shelf oceanographic regime from the St. Lawrence River. Where the topography of the shelf permits, some deep water enters the Scotian Shelf from the continental slope.

12. The greater part of the water in the Gulf of Maine Basin (60 to 70 per cent annually) enters it through the Northeast Channel from the continental slope⁵. This water usually enters the Basin between a depth of 75 meters and the bottom of the Northeast Channel⁶. The volume of water entering through the Northeast Channel is sufficient to replace the water in the Basin every year⁷. Most of the remainder of the water in the

¹ The Georges Bank regime includes Nantucket Shoals. For ease of identification, the regime is referred to throughout this Annex as the Georges Bank regime.

² The regimes are different from one another in terms of temperature ranges and average temperatures, as well as seasonal cycles of temperature.

³ See para. 4, n. 1, *supra*.

⁴ B. Butman, *et al.*, "Recent Observations of the Mean Circulation on Georges Bank", in *Journal of Physical Oceanography*, Vol. 12, No. 6, 1982, pp. 569, 571.

⁵ S.R. Ramp, R.J. Schlitz, and W.R. Wright, "Northeast Channel Flow and the Georges Bank Nutrient Budget", Paper prepared for presentation at International Council for the Exploration of the Seas (I.C.E.S.), 1980, pp. 1-12. On p. 4, the authors note that "[t]he mean transport for the entire two-year experiment is $276 \times 10^3 \text{ m}^3/\text{sec}$. [270,000 cubic meters of water per second] which gives a replacement time of approximately one year".

Table A. The Three Oceanographic Regimes of the Gulf of Maine Area: Summary of Physical Characteristics and Origins of Water

REGIME	PHYSICAL CHARACTERISTICS ¹									ORIGINS OF WATER
				Winter			Summer			
	Stratification		Depth ²	Temp. °C	Sal.p.p.t. ³	Dens. ⁴	Temp. °C	Sal.p.p.t. ³	Dens.	
SCOTIAN SHELF	3-Layered (Well-defined)	Surface	0-50	1	31	24.8	3-10	31	24.0	St. Lawrence River outflow
		Intermediate	50-100	3	32.5	25.9	3	32.5	25.9	Labrador Current
		Bottom	100-bottom	8	34	26.5	8	34	26.5	Slope water
GULF OF MAINE BASIN	3-Layered (Indistinct)	Surface ⁵	0-50	3	33.0	26.3	12-18	32.5	24.0	Slope water entering through the Northeast Channel and surface water from the Scotian Shelf
		Intermediate	50-100	3	33.0	26.3	4	33	26.2	
		Bottom	100-bottom	5	33.5	26.5	6	33.5	26.4	Slope water entering through the Northeast Channel
GEORGES BANK	Well-mixed	—	0-bottom	3	32.5	25.9	15-18	32.5	24.0	Surface and intermediate layers of the Gulf of Maine Basin

¹ Mean values are listed for the physical characteristics.² Depths are expressed in meters.³ "p.p.t." means parts per thousand.⁴ Density is expressed here in units of "sigma t" — a common oceanographic shorthand. An increase of one sigma t unit, accompanied by an increase in depth, will substantially inhibit vertical mixing.⁵ In the winter, surface cooling and winds mix the upper 100 meters of the Gulf of Maine Basin, and the upper two layers of water are merged. In the summer, surface warming creates a surface layer that is distinct from an intermediate layer of colder water remaining from the previous winter.

Gulf of Maine Basin enters it at the surface from the Scotian Shelf¹. A small percentage of the water coming into the Basin, less than five per cent, is fresh water that enters as precipitation or runoff either from rivers or directly from land². Two-thirds or more of the fresh water that enters the Gulf of Maine Basin each year comes from precipitation³, which is the source of approximately one per cent of all the water entering the Basin per year. Roughly one-third of the fresh water, or 0.5 to 0.6 per cent of the total water in the Gulf of Maine Basin, is from river inflow⁴. Of this small amount of river inflow, two-thirds or more is from United States rivers and approximately one-third is from Canadian rivers⁵. Thus, approximately 0.4 per cent of the water in the Gulf of Maine Basin is from United States rivers, and approximately 0.2 per cent is from the Bay of Fundy and Nova Scotia.

13. The water over Georges Bank originates chiefly from the surface and intermediate waters of the Gulf of Maine Basin⁶. Georges Bank water evolves from the mixture of the deep water that enters the Basin through the Northeast Channel and the surface water that enters the Basin from the Scotian Shelf.

B. DIFFERENT CIRCULATION PATTERNS DISTINGUISH THE THREE OCEANOGRAPHIC REGIMES OF THE GULF OF MAINE AREA

14. Currents are guided in particular directions by the topography of the seabed. As noted above, the Scotian Shelf, the Gulf of Maine Basin, and Georges Bank are each characterized by a different topography. Therefore, as would be expected, each of the three oceanographic regimes in the Gulf of Maine area is characterized by a distinct pattern in which water circulates within the regime. These different patterns are shown in

¹ Bigelow, *op. cit.*; W. H. Sutcliffe, Jr., R. H. Loucks, and K. F. Drinkwater, "Coastal Circulation and Physical Oceanography of the Scotian Shelf and the Gulf of Maine", in *Journal of the Fisheries Research Board of Canada*, Vol. 33, 1976, pp. 98-115.

² C.D. Bue, *Streamflow from the United States into the Atlantic Ocean During 1931-60*, U.S. Geological Survey Water-Supply Paper 1899-I, 1970, pp. 1-136.

³ 5,500 cubic meters per second. *World Weather Records*, United States Dept. of Commerce, 1965, pp. 225-226.

⁴ 2,400 cubic meters per second. Bue, *op. cit.*, pp. 1-136; and *Discharge of Selected Rivers of the World*, UNESCO, Vol. II, 1971. Monthly and annual discharges recorded at various selected stations (from start of observations up to 1964).

⁵ Bue, *op. cit.*, pp. 1-136, and *Discharge of Selected Rivers of the World*, *ibid.*

⁶ As will be discussed later, the intermediate layer lies between the surface and bottom layers and is intermediate in terms of temperature, salinity, and, consequently, density.

the overall surface circulation pattern, presented in Figure 8¹, and in the deeper circulation pattern, presented in Figure 9².

15. Figure 8 shows how water over the Scotian Shelf flows from the northeast to the southwest, moving parallel to the coast. Water may be retained temporarily over the Scotian Shelf as small gyres form over its scattered banks. Toward the southwestern end of the Scotian Shelf, the surface water is interrupted in its southwestward progression. Before it reaches Browns Bank, part of the surface water flows seaward over the continental slope. The remainder continues southwestward, and then turns sharply around the southern tip of Nova Scotia into the Gulf of Maine Basin.

16. The topography of the Northeast Channel and that of the Gulf of Maine Basin interrupt the southwestward flow of water. As noted above, water flows through the Northeast Channel into the Gulf of Maine Basin between a depth of 75 meters and the bottom, and flows to the west toward Wilkinson Basin and to the north toward Jordan Basin. The portion that moves west is mixed gradually with the waters above it. That portion moving to the north moves more rapidly and in greater volume, and mixes relatively quickly with the surface waters entering the Basin from the Scotian Shelf. The waters of the Gulf of Maine Basin regime evolve from the mixture of water entering through the Northeast Channel and from the Scotian Shelf. This mixture moves northward toward the Bay of Fundy, then flows southwest along the New England coast, and finally turns northeastward along the northern edge of Georges Bank to the western edge of the Northeast Channel. Within the Gulf of Maine Basin, the water moves in a large, irregular, counterclockwise gyre³, centered

¹ Figure 8. The principal surface currents in the Gulf of Maine area, superimposed on Figure 2. The volume of transport is indicated by the width of the arrows. Water at the surface progresses to the southwest from Nova Scotia to Cape Hatteras. It deviates significantly from this general path, however, taking an "S" shaped detour around the Gulf of Maine Basin, then northeastward along the northern edge of Georges Bank to the southwestern edge of the Northeast Channel, after which it again turns westerly around the eastern tip of Georges Bank and then along the southern margin of the Georges Bank regime to southern New England and beyond.

² Figure 9. Currents below 150 meters, superimposed on Figure 2. The volume of transport is indicated by the width of the arrows. The Northeast Channel provides direct access to the Gulf of Maine Basin for continental slope water of a constant temperature and high salinity. This water flows into the Basin at the bottom, then divides to the north toward the Bay of Fundy and to the west toward Wilkinson Basin. About 60 to 70 per cent of the water enters the Basin in this manner, where it has a profound effect upon the climate and current dynamics of the area.

³ The word "gyre" describes a semi-enclosed pattern of circulation.

approximately over the eastern edge of Wilkinson Basin. Water may be retained within this gyre for a year or more¹.

17. The current that moves northeastward along the northern edge of Georges Bank to the Northeast Channel proceeds round the eastern tip of the Bank, then turns back along the seaward side of Georges Bank and Nantucket Shoals, moving southwestward along the 80-meter depth-contour to the southern New England shelf and beyond. A clockwise gyre is formed over Georges Bank. This gyre is strongest during the warmer months of the year, when water is retained on the Bank for about three months before moving on to the southern New England shelf².

C. DIFFERENCES IN TEMPERATURE DISTINGUISH THE THREE SEPARATE AND IDENTIFIABLE OCEANOGRAPHIC REGIMES

18. Temperature, including its seasonal variability, is a critical environmental factor in determining the distribution and abundance of organisms³. The range of some organisms is limited by cold, and that of others by warm, water. Still other organisms are tolerant of wide ranges of temperature, provided the annual average does not exceed, or fall below, a particular temperature. The three oceanographic regimes in the Gulf of Maine area are significantly different from one another in terms of temperature. Figure 10⁴ shows the average bottom temperatures of each regime both for the coldest and for the warmest seasons of the year, as well as the difference in average bottom temperatures between the two seasons. Figure 10 shows that the water over Georges Bank is similar in bottom temperature to the water over the southern New England shelf, confirming that Georges Bank is a thermal extension of the southern New England shelf. The Georges Bank regime and that of the continental shelf to the southwest are both characterized by marked seasonal differences in temperature. By contrast, the water in the Gulf of Maine Basin is more constant in temperature throughout the year. In Figure 10, the Northeast

¹ See Ramp, Schlitz, and Wright, *op. cit.*; and A. C. Redfield, "The Effect of the Circulation of Water on the Distribution of the Calanoid Community in the Gulf of Maine", in *Biological Bulletin*, Vol. LXXX, No. 1, 1941, pp. 86, 104, and Figure 10. This means that it can take a year or more for water from the Scotian Shelf to reach Georges Bank. Furthermore, before this water reaches the Bank, it has been transformed through its mixture with the water entering the Basin through the Northeast Channel.

² D. F. Bumpus and L. M. Lauzier, "Surface Circulation on the Continental Shelf off Eastern North America Between Newfoundland and Florida", in American Geographical Society, *Serial Atlas of the Marine Environment*, folio 7, 1965, pp. 1-4.

³ As will be discussed below, temperature is also important as one of the two factors that determine the density of sea water.

⁴ Figure 10. Bottom temperatures based upon data from National Oceanographic Data Centre files for the years 1940-1980.

Channel both joins the Gulf of Maine Basin to the continental slope and separates the Georges Bank regime from that of the Scotian Shelf. The effect of the water entering through the Northeast Channel upon temperatures within the Gulf of Maine Basin is clearly shown. Because this water enters along the northeastern side of the Channel, the water above the sides of Browns Bank that face the Northeast Channel and the ocean is distinctly warmer than is the water at comparable depths over other parts of the Scotian Shelf. The warming influence of the slope water extends around the periphery of the Gulf of Maine Basin, creating an area of waters with near-constant temperatures that are intermediate between those of the deeper parts of the Basin and those of the waters above Georges Bank.

- (121) 19. Figure 11A¹ is a satellite image indicating differences in surface temperature among the three regimes in June. In this Figure, the Georges Bank regime is clearly defined, and the regime of the Gulf of Maine Basin is joined to the continental slope through the Northeast Channel. Figure (121) 11B shows the temperature gradients for the same time. The lines indicate where the surface temperatures change markedly over a short distance². (121) Figure 11C superimposes these temperature gradients over the satellite temperature image, and thus highlights the areas where fronts form between the contrasting regimes of Georges Bank and of the Gulf of Maine Basin and between those of the Scotian Shelf and of the Gulf of Maine Basin³.

20. A summary of the temperatures in the three separate and identifiable regimes is given in Table A⁴. On the Scotian Shelf, the temperature of the waters reflects their cold northern origins. In the winter, the surface waters of the Scotian Shelf can be as cold as 0 degrees Centigrade, or less. Cold temperatures persist at intermediate depths for much of the year. In the Gulf of Maine Basin, cold surface waters from the Scotian Shelf are mixed with deeper water of a relatively constant temperature—from six to eight degrees Centigrade—that enters through the Northeast Channel (120) from the continental slope. Figure 10 shows that, in the Gulf of Maine Basin, there is relatively little variance in bottom temperatures throughout the year. As would be expected, these temperatures are similar to those of the water entering the Basin through the Northeast Channel. The water

(121) ¹ Figure 11. Surface temperatures as shown by the N.O.A.A. 5 Satellite. This 14 June 1979 scene is representative of warm season conditions.

² The thermal gradients shown are those greater than 0.7 degrees centigrade (C.) per kilometer.

³ Average surface temperatures for the four seasons of the year are shown in Figure 12. This figure is based upon data from National Oceanographic Data Centre files for the years 1940-1980.

⁴ Para. 10, *supra*.

in the Gulf of Maine Basin is slightly warmer year round than is the water over the Scotian Shelf, and it varies less between the cold and warm seasons.

21. The water over Georges Bank and Nantucket Shoals is shallow and mixed vigorously by tides. As a result, it is strongly affected by atmospheric conditions and varies widely in temperature from season to season. As is shown in Figure 10, this seasonal pattern extends southwestward along the southern New England shelf. The water over Georges Bank is warmer in the summer than is the water over the Scotian Shelf, and it has an annual mean temperature that is considerably higher. Although this water is cold in the winter, it does not reach the more extreme cold temperatures reached by the waters over the Scotian Shelf.

D. DIFFERENCES IN SALINITY DISTINGUISH THE THREE SEPARATE AND IDENTIFIABLE OCEANOGRAPHIC REGIMES

22. The three oceanographic regimes in the Gulf of Maine area differ from one another in terms of salinity. Salinity is significant for two reasons: it is one of the two factors that determine the density of sea water; and, it affects the distribution of organisms. Many organisms have salinity preferences and respond accordingly.

23. Table A¹ includes a summary of the levels of salinity within the three regimes. The surface and intermediate waters of the Scotian Shelf are low in salinity, as a result both of the influx of fresh water from the St. Lawrence River and of the low salinities of the Labrador Current water. The bottom waters of the Scotian Shelf are higher in salinity, because, where topography permits, some water enters the Scotian Shelf regime from the continental slope.

24. The water in the Gulf of Maine Basin also has three tiers, or layers, of different salinities, although the tiers are considerably less distinct than are those of the Scotian Shelf. The water at the surface of the Basin is less saline than the water that enters the Basin through the Northeast Channel, filling the bottom of the Basin. Between the surface and bottom layers, an intermediate layer of water is formed that is less saline than the bottom water, but more saline than the surface water. The differences in salinity between surface and bottom waters in the Gulf of Maine Basin dissipate rapidly where the Gulf of Maine Basin meets the Scotian Shelf. At that point, as noted above, the saline water entering the Basin through the Northeast Channel mixes with the water of lower salinity entering the Basin from the Scotian Shelf.

25. The water over Georges Bank and Nantucket Shoals is of moderate salinity, because it is derived from the surface and intermediate layers in

¹ Para. 10, *supra*.

the Gulf of Maine Basin. Figure 13¹ shows the average surface salinity for each of the three oceanographic regimes in the Gulf of Maine area.

26. Water density is a function of temperature and salinity. Density plays an important role in determining the direction in which water moves and the rate at which it moves, just as differences in air pressure determine the direction and velocity of winds. A small difference in density may have a profound effect upon the movement of water and the development of gyres and fronts within the water column.

27. In the Gulf of Maine area, density varies between 23 and 28 units of density ("sigma t"). This range of five units of density is approximately 20 per cent of the maximum density (about 28 sigma t). Such a range is significant: it is analogous to a similar change in air pressure associated with different atmospheric air masses, e.g., from 27 to 32 inches of mercury (barometric pressure)².

28. As discussed above, the temperature and salinity characteristics are distinctive for each of the three separate and identifiable oceanographic regimes. The density of the water in each of the three regimes, therefore, is also different. Figure 14³ shows the average density of the water column in the Gulf of Maine area in each of the four seasons. In terms of density, as in terms of temperature and salinity, the waters over Georges Bank are an extension of those over the southern New England shelf. The Northeast Channel separates Georges Bank from the Scotian Shelf, and links the Gulf of Maine Basin to the continental slope.

E. DIFFERENCES IN THE DEGREE TO WHICH THEIR WATERS ARE STRATIFIED OR VERTICALLY MIXED DISTINGUISH THE THREE SEPARATE AND IDENTIFIABLE OCEANOGRAPHIC REGIMES

29. The degree to which water is mixed vertically is important in the production of both marine plants and the marine organisms that depend upon those plants. In the Gulf of Maine area, the three oceanographic regimes vary in terms of whether, and the degree to which, their waters either are mixed vertically (i.e. Georges Bank) or are stratified (i.e. the Scotian Shelf and, to a lesser degree, the Gulf of Maine Basin).

¹ Figure 13. Average surface salinities for four seasons (for depths of 0 to 30 meters), based upon data from National Oceanographic Data Centre files for the years 1940-1980.

² This is a change of approximately 15 per cent of the maximum air pressure (about 32 inches of mercury). Dramatic atmospheric consequences (for example, a shift from a bright sunny day to a violent storm) result from barometric pressure changes of just a few inches. A change in seawater density of one or two "sigma t" units has consequences that are comparable in significance.

³ Figure 14. Average water column densities for four seasons, based upon data from National Oceanographic Data Centre files for the years 1940-1980.

30. Vertical mixing is inhibited by stratification of the water. Stratification is due to differences in temperature or salinity, or both. As noted above and in Table A, the water over the Scotian Shelf is layered. The water at the surface is dominated by water from the Gulf of St. Lawrence, and thus is fresher and less dense. Due to occasional inputs of water from the continental slope, the water at the bottom is more highly saline and thus denser. Between the surface and the bottom layers, the intermediate layer is dominated by water from the Labrador Current, which is cold and relatively low in salinity. Accordingly, there are three layers of water over the Scotian Shelf that increase in density with increasing depth. Relatively little vertical mixing disturbs the three-tiered system that develops over the Scotian Shelf.

31. The water in the Gulf of Maine Basin also has three layers, but they are less sharply defined than are those over the Scotian Shelf. The water in the Gulf of Maine Basin nevertheless is more rigidly stratified than is the well-mixed water over Georges Bank. The stratification in the Gulf of Maine Basin is attributable to the different origins of the water entering the Basin. The water at the bottom enters the Basin through the Northeast Channel from the continental slope and is relatively dense. The surface and intermediate layers are a mixture of the water entering at the surface from the Scotian Shelf and of the bottom waters entering through the Northeast Channel¹.

32. The water in the Gulf of Maine Basin is vertically mixed along the southwestern tip of the Scotian Shelf, where these two regimes meet. There, the water flowing into the bottom of the Gulf of Maine Basin through the Northeast Channel mixes with the surface water flowing in from the Scotian Shelf. In contrast to the more stratified water in the center of the Gulf of Maine Basin, peripheral water is well-mixed as a consequence of the flow of this water working against the shallower edges of the Basin, under the influence of winds and tides.

33. In contrast to the precisely layered waters of the Scotian Shelf and the more moderately layered waters of the Gulf of Maine Basin, the waters over Georges Bank are mixed from top to bottom year-round. This mixing is caused primarily by the tidal currents coursing over the shallow topography of Georges Bank.

34. All of the temperature, salinity, density, and mixing characteristics of the three oceanographic regimes in the Gulf of Maine area are

¹ As noted above, the intermediate water of the Scotian Shelf originates primarily from the Labrador Current, and thus is different in character and in origin from the surface and bottom waters of the Scotian Shelf. The Gulf of Maine Basin is less stratified, because the intermediate layer of water does not have an origin separate from those of the surface and bottom layers; rather, it is a mixture of these two.

interdependent. For example, the stratification of the water column over the Scotian Shelf or over the Gulf of Maine Basin is reflected in the temperatures, salinities, and densities in each regime. Similarly, temperature, salinity, and density data for the Georges Bank regime evince the degree of vertical mixing that occurs over the Bank. Figures 15, 16, and 17 afford an overview of the characteristics of the three oceanographic regimes. Figure 15 shows a hydrographic cross-section along a line of longitude, and contrasts the physical characteristics of the Gulf of Maine Basin regime with those of the Georges Bank regime. Figure 16 shows a hydrographic cross-section along a line of latitude, and contrasts the oceanographic regime of the Gulf of Maine Basin to that of the Scotian Shelf, while Figure 17 shows a hydrographic cross-section of the Northeast Channel along a diagonal line from Georges Bank to the Scotian Shelf.

- (121) 35. Figure 15¹ shows how the water column over Georges Bank is well-mixed from top to bottom year-round. In the warm season, a pronounced thermal and salinity front develops at the surface along the southern edge of Georges Bank. See Figure 11, *supra*. During the cold season, the bottom water of the Gulf of Maine Basin is warmer than the surface water, and is as warm as the water along the continental slope. The water carried by the currents around the periphery of the Gulf of Maine Basin is somewhat colder and slightly less saline than the deeper water of the Basin.

36. Figure 16² shows that the water over the Scotian Shelf (particularly at the surface) is colder and less dense than the water of the Gulf of Maine Basin. Scotian Shelf water is more rigidly stratified than that of the Gulf of Maine Basin. The vertical mixing that occurs where the Gulf of Maine Basin and the Scotian Shelf meet, and where deep water from the Northeast Channel mixes with surface water from the Scotian Shelf, is particularly noticeable in the illustration of warm season temperatures. In the German Bank area, water from the bottom nearly to the surface is from eight to ten degrees Centigrade.

37. Figure 17³ demonstrates how water entering the Gulf of Maine Basin through the bottom of the Northeast Channel is relatively constant in temperature year-round and is denser (and more saline) than is the water at the surface. It also shows the contrast between the water over Georges Bank and that over Browns Bank on the Scotian Shelf.

¹ Figure 15 is based upon data from National Oceanographic Data Centre files for the years 1940-1980.

² Figure 16 is based upon data from National Oceanographic Data Centre files for the years 1940-1980.

³ Figure 17 is based upon data from National Oceanographic Data Centre files for the years 1940-1980.

SECTION 3. The Tides in the Gulf of Maine Area Interact With and Reflect the Topographic Features Underlying and Separating the Three Oceanographic Regimes of the Area

38. Water, the atmosphere, and the earth itself respond to gravitational pull. The dominant gravitational forces are the moon and the sun. The oceans respond directly to the moon to produce tides of approximately 12.4 hours duration (one half-lunar day)¹. Tides vary in complexity with that of the topography over which they move.

39. The tides in the Gulf of Maine area reflect the different topographic features described in Chapter I, Section 1. Figure 18² shows the flood and ebb tidal currents in the Gulf of Maine area. The differences in the size of the arrows indicate differences in velocity, which is affected by the topography of the area. Georges Bank and the Northeast Channel are sharply defined in Figure 18³. Tides cause the water column in the shallower areas to be mixed from the surface to the bottom. In response to tidal forces, water in the Gulf of Maine area moves twice daily in an elliptic pattern. Figure 19⁴ shows the shape of the ellipses followed by water at different points in the Gulf of Maine area. Figure 19 illustrates the differing movement of water over Georges Bank, over the Scotian Shelf, in the Northeast Channel, and in the Gulf of Maine Basin. The distance that the water is moved by the tides in the shallower areas, such as Georges Bank, is greater than is the distance in the deeper areas, such as the center of the Gulf of Maine Basin.

¹ In the Northwest Atlantic, the semi-diurnal (twice daily) tides dominate; the diurnal (daily) component is small.

² Figure 18 is a reproduction of two maps prepared for the United States Dept. of the Interior, Minerals Management Service, by the Dept. of Ocean Engineering and Graduate School of Oceanography, University of Rhode Island, and Applied Science Associates, Inc.

³ Figures 18 and 19 in the Canadian Memorial show tidal currents for periods only three hours apart. These figures do not represent the extremes of the tidal currents (maximum flood and maximum ebb). In Canadian Figure 18, the tide is still turning. Because the horizontal spacing between the arrows in both figures is coarse (based on a grid of approximately 22.5 km), the illustration of interaction between the topography of the area and the tidal currents is minimized. By contrast, Figure 18 of this Annex shows the extremes of the tidal currents (maximum ebb and maximum flood). The spacing between the arrows is finer (based on a 12.5 km grid) and results in a truer representation of the effects of the area's topography—such as the steep gradients on the sides of the banks—on the tidal currents.

⁴ Figure 19. Representative M₂ tidal ellipses. The ellipses selected are located at approximately mid-water depth. Numbers inside or near the ellipses are the instrument depths in meters. Tick marks along the edge of the ellipses indicate the hour at Greenwich. Prepared by J. A. Moody and B. Butman, United States Geological Survey, Woods Hole, Massachusetts.

40. Tides are critical to the vertical mixing of the water column over shallow areas, and, as a result, are important in determining the amount of plant production that takes place in such areas. In combination with other factors, tides also contribute to the development of the pattern in which water circulates through the area. Tides provide much of the force that mixes the water entering the Gulf of Maine Basin from the Northeast Channel with that entering at the surface from the Scotian Shelf. Most of the tidal energy that enters the Gulf of Maine Basin comes through the Northeast Channel. Figure 20¹. As can be seen in Figure 20, the tidal energy that enters the Gulf of Maine Basin through the Northeast Channel is greater than the tidal energy entering the Bay of Fundy from the Gulf of Maine Basin².

¹ Figure 20. From D.A. Greenberg, "A Numerical Model Investigation of Tidal Phenomena in the Bay of Fundy and Gulf of Maine", in *Marine Geodesy*, Vol. 2, No. 2, 1979, pp. 167, 177, Figure 9, "Net and oscillating power across various lines in the model". Deposited with the Court by Canada pursuant to Article 50(2) of the Rules of Court.

² Greenberg, in describing a numerical model used to investigate tidal phenomena in the Bay of Fundy and the Gulf of Maine, stated that "[t]he net power transferred across the open boundary of the model is largest at the entrance of the Fundian Channel" [the Fundian Channel is another name for the Northeast Channel]. *Op. cit.*, p. 176. A figure from his article, reproduced here as Figure 20, illustrates his findings. In his summary, he states that "[m]ost of the tidal energy enters the system through the Fundian Channel". *Ibid.*, p. 185.

CHAPTER II

THE ECOLOGY OF THE GULF OF MAINE AREA

INTRODUCTION

41. The distribution of living organisms within the Gulf of Maine area is determined, to a large extent, by the interaction of marine flora and fauna with the oceanographic factors described in Chapter I. The following are several examples of the interaction:

- a. vertical mixing of the water column stirs up nutrients critical to the production of marine plants;
- b. currents transport microscopic plants, fish eggs, and larvae;
- c. topography and bottom sediment affect the distribution of bottom-dwelling organisms;
- d. salinity and variations in temperature influence significantly the distribution of fish species; and
- e. gyres are important in forming separate subpopulations or stocks of fish.

42. The juxtaposition within the Gulf of Maine area of the three separate and identifiable oceanographic regimes has given rise to the formation of distinct biological communities within those regimes. Each biological community and its corresponding oceanographic regime together constitute an ecological regime. Thus, the Gulf of Maine area contains three distinct ecological regimes associated with the Scotian Shelf, the Gulf of Maine Basin, and Georges Bank, respectively.

SECTION 1. The Gulf of Maine Area Is Divided into Three Separate and Identifiable Ecological Regimes

A. THE PRODUCTION OF MARINE PLANTS IN THE GULF OF MAINE AREA REFLECTS THE WATER DYNAMICS OF THE THREE SEPARATE AND IDENTIFIABLE OCEANOGRAPHIC REGIMES

43. The energy that forms the base of the marine food chain is derived from sunlight through the photosynthetic activity of plants. This activity is referred to as primary production. Most of the plants suspended in the

ocean are microscopic, single-celled organisms known as phytoplankton.¹ The rate of production, or photosynthesis, is directly proportional to the amount of sunlight that the phytoplankton receive. Other factors influencing production include the availability of nutrients, the extent to which the water column is vertically mixed, and the rate at which the plants are consumed.

44. Primary production is stimulated where the water column is vertically mixed. This mixing brings nutrients from the lower levels of the water column up to the sunlit layers, where plants can grow. Such stirring occurs particularly in shallow areas, over banks or along the coast, as a result of the wind or the tides, or both.

45. Portions of the Gulf of Maine area demonstrate a consistent pattern of primary production from year to year. As Figure 21² shows, primary production is stimulated in those areas where the water from the Scotian Shelf is enriched by the water coming into the Gulf of Maine Basin through the Northeast Channel and the water column is sufficiently shallow, i.e., less than 100 meters in depth. Within the Gulf of Maine Basin, along the coastal region from Cape Cod to Grand Manan Island, coastal upwelling caused principally by prevailing winds stimulates primary production. In the deeper areas of the Gulf of Maine Basin, production is stimulated for a relatively brief period, when the water column reaches a certain level of stability and before the nutrients suspended in the surface waters are depleted. On Georges Bank and Nantucket Shoals, production is a direct result of the flow of nutrient-rich water from the intermediate layer of the Gulf of Maine Basin onto the Bank and Shoals, where the water is mixed constantly from top to bottom by the tides and winds.

46. Phytoplankton is retained within the Gulf of Maine Basin by its counterclockwise gyre, and over Georges Bank by its clockwise gyre. These gyres contribute to the development of separate and distinct phytoplankton communities in the area. The Scotian Shelf regime and the

¹ The seaweeds that adhere to rocks along the seashore and those that live in the shallow coastal waters make a minimal contribution to the primary production of the area.

² Figure 21. A Coastal Zone Color Scanner (C.Z.C.S) Image showing the distribution of chlorophyll and other pigments in the near-surface layers on 14 June 1979. The relative amount of these pigments corresponds to the relative abundance of phytoplankton, except inshore, where other pigments are also present and may exaggerate the abundance of phytoplankton. Increasing concentrations of pigments are indicated by progressively cooler colors. The greatest amounts of pigment are indicated in blue, lesser amounts are in green, still lesser amounts are in yellow, and the least amounts are in red. This image was computer-generated from data acquired by the Nimbus 7 satellite. Images showing the annual progression of phytoplankton production in the Gulf of Maine area are contained in Appendix I.

deeper waters of the Gulf of Maine Basin are characterized by smaller phytoplankton ("nanno" plankton) communities, while the well-mixed, relatively shallow Georges Bank regime is characterized by larger phytoplankton ("net" plankton) communities.

47. The separation of distinct phytoplankton communities and their relationship to the physical oceanography of the area are evident in Figure 22¹. This Figure combines information on phytoplankton and on temperature for each of the three oceanographic regimes. The significance of the Northeast Channel is apparent, as is the front that develops where the water from the Scotian Shelf is mixed with the slope water entering through the Northeast Channel.

48. Although the gyres in the Gulf of Maine Basin and over Georges Bank retain water and suspended materials such as phytoplankton for considerable lengths of time, water and suspended matter eventually are carried through the area along the general circulation pattern. *See* Figure 8, *supra*. The amount of material moved depends upon the speed and quantity of water in motion. Faster currents carry slowly sinking material farther than slower currents. Small organisms that live at or near the surface, such as phytoplankton, zooplankton (small herbivorous organisms), the eggs and larvae of fish, and the larval stages of many invertebrates, are particularly susceptible to being transported with the currents.

49. In particular, phytoplankton and other small organisms are transported from Georges Bank to the southern New England shelf and farther to the southwest. Because the life cycle of many phytoplankton species is measured in hours or days, evidence of phytoplankton transport is short-lived, but phytoplankton and their decaying remains furnish nutrients to the areas into which they are swept.

B. ZOOPLANKTON PRODUCTION AND DISTRIBUTION IN THE GULF OF MAINE AREA REFLECTS THE WATER DYNAMICS AND OTHER PHYSICAL CHARACTERISTICS OF THE THREE SEPARATE AND IDENTIFIABLE OCEANOGRAPHIC REGIMES

50. Zooplankton are capable of controlling their movement, to a limited degree, by swimming. They are nonetheless transported continu-

¹ Figure 22. The interaction between pigment and temperature in the Gulf of Maine Area for the month of June as shown by cluster analysis. Such an analysis reveals the manner in which phytoplankton communities are related to temperature. This figure was developed by combining C.Z.C.S. pigment data and Advanced Very High Resolution Radiometer (A.V.H.R.R.) thermal data, for 14 June 1979. Areas of the same color are areas sharing comparable thermal and pigment conditions.

ously by currents¹. They congregate in areas of high phytoplankton production, and, like phytoplankton, are usually retained in the Gulf of Maine Basin by the counterclockwise gyre (for about one year) and over Georges Bank by its clockwise gyre (for about three months). The life cycle of zooplankton is longer than that of phytoplankton, lasting from weeks to months or even longer. Some zooplankton are transported out of the Gulf of Maine Basin regime by the current that runs along the northern edge of Georges Bank and the southwestern edge of the Northeast Channel, then back along the southern edge of Georges Bank. Others pass out of the Georges Bank gyre and down the southern New England shelf. Others are swept from the Scotian Shelf into the Gulf of Maine Basin.

51. In spite of the movement of zooplankton from regime to regime and their tolerance for varying conditions, the communities of zooplankton associated with the Scotian Shelf, the Gulf of Maine Basin, and Georges Bank are different. Each community includes some species that do not appear in the other two². Although the same species dominate in each community, they do so at different times of the year. Thus, *Calanus finmarchicus*, a small crustacean, dominates the zooplankton community of the Scotian Shelf during all but the warmest months of the year, and *Centropages typicus*, another small crustacean, dominates the zooplankton community on Georges Bank, and the continental shelf to the southwest, during all but the coldest months of the year. By contrast, *Calanus finmarchicus* dominates Georges Bank for a short period during the colder months of the year and *Centropages typicus* dominates the Scotian Shelf for a short period during the warmest months.

¹ H. B. Bigelow, "Plankton of the Offshore Waters of the Gulf of Maine", in United States Bureau of Fisheries, *Bulletin*, Vol. XL, Part 2 (Doc. 968), 1926, pp. 1-509; previously deposited with the Court pursuant to Article 50(2) of the Rules of Court; A. C. Redfield, "The Effect of the Circulation of Water on the Distribution of the Calanoid Community in the Gulf of Maine", *Biological Bulletin*, Vol. LXXX, No. 1, 1941, pp. 86-110; A. C. Redfield and A. Beale, "Factors Determining the Distribution of Populations of Chaetognaths in the Gulf of Maine", *Biological Bulletin*, Vol. LXXIX, No. 3, 1940, pp. 459-487; A. C. Redfield, "A History of a Population of *Limacina Retroversa* During its Drift Across the Gulf of Maine", *Biological Bulletin*, Vol. LXXVI, No. 1, 1939, pp. 26-47.

² See United States Memorial, para. 50 and Annex 44, Vol. II.

C. FISH SPECIES DISTRIBUTION IN THE GULF OF MAINE AREA REFLECTS THE WATER DYNAMICS AND OTHER PHYSICAL CHARACTERISTICS OF THE THREE SEPARATE AND IDENTIFIABLE OCEANOGRAPHIC REGIMES

52. There are over 200 species of fish in the Gulf of Maine area¹. Fewer than 40 of these, however, make up the bulk of the biomass². As no two species of fish are exactly alike, useful conclusions about the ecology of an area cannot be drawn from the examination of any single species. While the fate of smaller marine organisms is determined largely by the circulation pattern of water, adult fish move in response to their needs. Fish species can be categorized on the basis of their responses to the temperatures and other features (e.g., topography and currents) of the three oceanographic regimes in the area.

1. *Some Species of Fish Prefer Shallow Water and Do Not Show Pronounced Seasonal Movement*

53. Ocean pout, longhorned sculpin, yellowtail flounder, winter flounder, windowpane flounder, little skate, winter skate, sea raven, and cunner (the "yellowtail flounder-ocean pout" association³) are relatively abundant on Georges Bank and southwest to southern New England and

¹ In "Fishes of the Gulf of Maine", Bigelow and Schroeder discuss some 219 fish species. (The authors did not discuss benthos such as scallops or lobster.) They listed only those that would be expected to be in the Gulf to depths of 150 fathoms. H.B. Bigelow and W.C. Schroeder, "Fishes of the Gulf of Maine", *Fishery Bulletin* 74, Vol. 53, 1953, pp. iii-1. See Appendix L.

² Although a large number of different species of fish may be found in the area, the bulk of the biomass is made up of only a few species. Usually, the five or six most abundant species constitute more than 50 per cent of the total biomass. The uppermost 12 species constitute more than 80 per cent, and the uppermost 25 species more than 95 per cent of the total biomass. The relative position of a species, in terms of biomass, will vary over time, both because populations vary naturally, and because fishing reduces one species or another. Some of the more valued species, e.g., swordfish, constitute only a very small fraction of the total biomass. The uppermost ten species, in terms of their contribution to the biomass of the area in recent years, are silver hake, Atlantic herring, spiny dogfish, haddock, red hake, mackerel, pollock, thorny skate, cod, and redfish. R.L. Edwards, "Fishery Resources of the North Atlantic Area", *The Future of the Fishing Industry in the United States*, New Series, Vol. IV, 1968, pp. 52-60; R.L. Edwards, "Middle Atlantic Fisheries: Recent Changes in Populations and Outlook", in Special Symposium 2, American Society of Limnology and Oceanography, 1976, pp. 302-311.

³ The word "association" is used here in conjunction with common species names in the same manner that ecologists use such to group species that show similar adaptations to climatic factors, as, for example, the "Beech-Maple" forest of eastern North America. The term suggests a recognizable species complex that occupies a given region. Cf. L. R. Dice, *Natural Communities*, 1952, Chapter XX.

beyond. This group of species is also found on the Scotian Shelf where appropriate temperatures and bottom conditions exist. This group is fairly tolerant of wide temperature variations, and, unlike the fourspot flounder-bluefish association described below, does not move off the shallower portions of the Shelf during the colder months of the year. The species in the yellowtail flounder-ocean pout association generally favor coarser or sandy bottoms. See Figure 23¹. Members of this group are found regularly along the New England coast, along the eastern margin of the Gulf of Maine Basin where the water entering the Northeast Channel skirts Browns Bank and German Bank, and along the offshore Scotian Shelf banks where there is summer warming above 12 degrees Centigrade. Although these species are found along the Scotian Shelf, their abundance falls off increasingly to the north.

54. Most of these species attach their eggs to the seabed to ensure against their being swept away, possibly into an unfavorable environment (such as the unsuitable deeper portions of the Scotian Shelf). Many, if not all members of this group are represented by one or more separate stocks on either side of the Northeast Channel.

2. Some Species of Fish Move On and Off Shore Seasonally in Search of Warmer Water

55. A second group of species prefers relatively warm water and accordingly migrates seasonally. See Figure 24². The members of this group are more abundant on Georges Bank and to the southwest. They are found less frequently in the Gulf of Maine Basin and on the Scotian Shelf. This group includes red hake, spiny dogfish, silver hake, white hake, and goosefish (the "silver hake-spiny dogfish" association). The lobster, while not a fish, behaves similarly and thus may be included in this group. These species tend to move inshore or onto the banks, where the waters are warmer during the summer, and offshore into relatively warmer (usually slope) water during the winter³. In this respect, these species can be contrasted with the Atlantic herring-cod association discussed below.

¹ Figure 23. The yellowtail flounder-ocean pout association. This figure is based upon groundfish trawl-survey data, smoothed (fitted) using exact bicubic splines. The survey data has been provided to Canadian fishery authorities over the years, on a regular basis, by the Northeast Fisheries Center, National Oceanic and Atmospheric Administration, United States Dept. of Commerce. Canada cited a portion of this data in its Memorial, at para. 106, n. 25.

² Figure 24. The silver hake-spiny dogfish association. This figure is based upon groundfish trawl survey data, smoothed (fitted) using exact bicubic splines. The survey data has been provided to Canadian fishery authorities over the years, on a regular basis, by the Northeast Fisheries Center, National Oceanic and Atmospheric Administration, United States Dept. of Commerce. Canada cited a portion of this data in its Memorial, at para. 106, n. 25.

³ Of the members of the silver hake-spiny dogfish association, the goosefish appears to move the least.

Most of these species spawn during the warmer months. As discussed below, separate and identifiable stocks for several of these species—red hake, silver hake, white hake, and lobster—are associated with each of the three oceanographic regimes in the area ¹.

3. *Some Species of Fish Prefer Deep, Colder Water*

56. A third group of species likes cold, deep waters. It occupies the deeper portions of the Gulf of Maine Basin and suitable areas on the Scotian Shelf and northeastward. As with the yellowtail flounder-ocean pout association, it is seasonally constant in its distribution. See Figure 25 ². This group of species includes the witch flounder, redfish (more than one species), cusk, wolffish, Atlantic argentine ³, and thorny skate (the "redfish-wolffish" association). With few exceptions, members of this group are also found in European waters where, as in the Gulf of Maine Basin and in the deeper portions of the adjacent Scotian Shelf, the seasonal change in temperature is not marked. These species reach their southwestern limits in the Gulf of Maine Basin, and they are dependent upon the Basin gyre for the survival of their populations. The gyre in the Gulf of Maine Basin assures the retention within the regime of sufficient eggs and larvae to maintain these populations. There is virtually no overlap between the members of this species group and the members of the first group (yellowtail flounder-ocean pout association), described above, or the members of the fourspot flounder-bluefish association, described below. See Figures 23, *supra*, and 27, *infra*. The abundance of this group falls off sharply southwest of the Gulf of Maine Basin and the Northeast Channel, although individual members, notably the witch flounder, are found in the coldest waters of the southern New England Shelf as far to the southwest as the Hudson Canyon. They are

¹ For management purposes, there has never been a need to define stocks of dogfish or goosfish. Nevertheless, one may infer from distribution data and a knowledge of the physical oceanography (i.e., currents and gyres) of the area that there are at least two dogfish stocks in the area (in the Gulf of Maine Basin and in the southern New England – mid-Atlantic region), and that there are at least four stocks of goosfish (near Sable Island, over Browns Bank, in the Gulf of Maine Basin, and in the southern New England – mid-Atlantic region).

² Figure 25. The redfish-wolffish association. This figure is based upon groundfish trawl-survey data, smoothed (fitted) using exact bicubic splines. The survey data has been provided to Canadian fishery authorities over the years, on a regular basis, by the Northeast Fisheries Center, National Oceanic and Atmospheric Administration, United States Dept. of Commerce. Canada cited a portion of this data in its Memorial, at para. 106, n. 25.

³ The argentine is included in this group, because it is present in considerable numbers in the deeper waters of the Gulf of Maine Basin. It is unlike the other members of the group, however, in that it has strong affinities with the slope water region. See Figure 49, *infra*.

able to survive in this zone, but there is no evidence that they constitute a self-perpetuating population. There is no reason to suggest that any of these species have more than one subpopulation within the Gulf of Maine Basin, with the possible exception of redfish.

4. *Some Species of Fish Move On and Off Shore Seasonally in Search of Cold Waters*

57. A fourth group, like the third, is composed principally of species that are found on both sides of the Atlantic Ocean. Moreover, the members of this group similarly prefer relatively cold water. This preference, however, is evidenced by movement into shallower, colder water in the winter and into deeper, colder water in the summer. These species reach their southern limit in the Georges Bank regime, and are more abundant to the north. Included in this group are the Atlantic herring, American plaice, cod, pollock¹, and haddock (the "Atlantic herring-cod" association). See Figure 26².

58. With the exception of the Atlantic herring, which deposits its eggs on the bottom, these species have eggs that are suspended in the water column. In the Gulf of Maine area, their subpopulations spawn in close association with gyres that tend to retain the eggs and larvae. One or more separate stocks of Atlantic herring, cod, and haddock occur in the Georges Bank regime³. The maintenance of these stocks over Georges Bank depends upon the Bank's gyre.

5. *Movement of Other Species*

59. There are some species found on Georges Bank and to the southwest that are only rarely in the Gulf of Maine Basin or over the Scotian Shelf. During the warmer period of the year, bluefish, northern sea robin, fourspot flounder, butterfish, summer flounder, and spotted hake,

¹ Most of the members of this group live close to the bottom. Accordingly, their food consists largely of animals that also live near the bottom. Pollock are more pelagic (swim at all levels of the water column), feeding on organisms that are abundant throughout the water column and near the surface (e.g., the euphausiid shrimps). They range widely in pursuit of their prey. In general, however, they are members of this group.

² Figure 26: The Atlantic herring-cod association. This figure is based upon groundfish trawl survey data, smoothed (fitted) using exact bicubic splines. The survey data has been provided to Canadian fishery authorities over the years, on a regular basis, by the Northeast Fisheries Center, National Oceanic and Atmospheric Administration, United States Dept. of Commerce. Canada cited a portion of this data in its Memorial, at para. 106, n. 25.

³ See the discussion of stocks in paras. 76 through 85, *infra*.

as well as the longfin (*Loligo*) squid (the "fourspot flounder-butterfish" association) may be found all along the mid-Atlantic coast and northeastward onto Georges Bank. The eastern tip of Georges Bank represents the general northeastward limit of distribution for these species, albeit, during very warm summers, they occasionally will be found to have ventured into the Gulf of Maine Basin. As the shallower coastal waters cool in the fall, these species move either offshore to the warmer slope water or to the southwest. See Figure 27¹.

60. These species have not developed separate stocks within the Georges Bank regime. They have adapted to the region to the southwest, and, if their eggs and larvae drift out of the Georges Bank gyre, they tend to be transported into a similarly favorable environment on the southern New England shelf.

61. There are still other species² more commonly found on the Grand Banks off Newfoundland and on the Scotian Shelf that are rarely present in the Gulf of Maine Basin or on Georges Bank, e.g., the Greenland halibut and the capelin.

62. There are other, relatively common species, e.g., the mackerel, that do not fit into the groups discussed above. Mackerel are found in abundance as far north as the Gulf of St. Lawrence, where a separate spawning subpopulation is maintained. While it is believed that there are several mackerel subpopulations, they are not easily identified, and mackerel are found throughout the Gulf of Maine area in the summer months. There is some evidence that all these subpopulations winter in the

¹ Figure 27. The fourspot flounder-butterfish association. This figure is based upon groundfish trawl survey data, smoothed (fitted) using exact bicubic splines. The survey data has been provided to Canadian fishery authorities over the years, on a regular basis, by the Northeast Fisheries Center, National Oceanic and Atmospheric Administration, United States Dept. of Commerce. Canada cited a portion of this data in its Memorial, at para. 106, n. 25.

² The five associations described in the preceding paragraphs are not exhaustive of the species groups formed in the Gulf of Maine area. Other species may also be grouped according to their ecological needs—as, for example, a group of species that is not as coherent as the five groups listed above, but that can be characterized as those species that live in the continental slope water. Such species include the argentine (year-round) and the shortfin (*Illex*) squid (during the colder months of the year).

mid-Atlantic region¹. There is also evidence that mackerel are present in the offshore Scotian Shelf region during the winter².

63. Like the mackerel, the shortfin (*Illex*) squid enters the Gulf of Maine area in the late spring, as the surface water warms. The shortfin squid is found throughout the area during the summer months, but it is restricted to the slope water region during the winter.

64. There are several highly migratory species that enter the area for short periods, usually during the summer months, such as bluefin tuna and swordfish³.

D. SEPARATE STOCKS ARE ASSOCIATED WITH EACH OF THE THREE OCEANOGRAPHIC REGIMES OF THE GULF OF MAINE AREA

1. Separate Stocks of Fish and Shellfish Species Have Formed Within Each of the Three Oceanographic Regimes in Response to Oceanographic and Ecological Factors

65. In the Gulf of Maine area, the water dynamics and other physical characteristics of the three separate and identifiable oceanographic regimes have led to the formation of separate fish stocks associated with each of those regimes.

As described in the United States Memorial:

"A 'stock' is a community of fish or shellfish that, under normal circumstances, is capable of maintaining itself without immigration from other communities of the same species. Damage done to the fish in one stock, whether by overfishing or other human activities, will affect the stock throughout the ecological regime in which it lives. Such damage would not, however, have any significant impact on maintenance of other stocks of the same species associated with different ecological regimes. A fish stock, rather than a species, is the appropriate subject of fisheries conservation and management efforts⁴."

¹ See para. 100, *infra*.

² Canadian groundfish survey data provided to the Northeast Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, United States Dept. of Commerce.

³ Several species of whales and porpoises pass through the area seasonally. Groups may remain in various localities for considerable periods of time during the warmer months of the year, e.g., white-sided dolphins, minke whales, humpback whales, and fin whales, which all appear regularly in the Stellwagen Bank region. In general, the toothed whales (Odontocetes) dominate on and around Georges Bank, and the baleen whales (Mysticetes) dominate on the Scotian Shelf.

⁴ Para. 52. [Citation omitted.] The Canadian Task Force on Atlantic Fisheries recently defined "stock" as a:

(footnote continued on following page)

66. A degree of geographic isolation is necessary before separate stocks can form within a species. A number of fish stocks are isolated from other stocks of the same species when, at particular times or places, they congregate to spawn. The relative separateness of spawning areas used by a given species is one useful criterion for defining the separation of that species into separate stocks. The relative discreteness of the areas within which eggs and larvae of each spawning population subsequently are found is another. Ecological factors also may contribute to the isolation of a stock. A stock that is isolated at spawning time may adapt to the particular ecological circumstances that are found on the spawning grounds.

67. Spawning aggregations occur at times and places that, over long periods, have fostered successful reproduction of the species. These aggregations may occur in response either to environmental cues that are consistent from year to year (such as fronts or bottom types), or, more likely, to an adaptive, "homing" sense. It is well documented that many species of fish have such a homing sense (e.g., such fresh water species as salmon and alewives, and such marine species as the winter flounder).

68. Fish have a variety of spawning strategies, including producing live young (dogfish and redfish); fastening eggs to the seabed (sculpins, skates, squid, and Atlantic herring); and releasing the eggs to the environment to be carried about in the currents (gadoid species—such as cod, haddock, silver hake, red hake, and white hake—most flounders, and mackerel). These strategies become increasingly important to the survival of a stock as a species approaches the limits of its geographic range. Eggs

(footnote continued from previous page)

"Term used to refer to a population of fish of one species that congregates and/or migrates within a given geographical area. Thus, there may be several stocks of fish for each species. The fish in each stock are genetically distinct, despite the fact that they belong to the same species, and thus each stock can be managed independently, because fish from one stock do not mix with those of another."

See Task Force on Atlantic Fisheries, *Navigating Troubled Waters (Highlights and Recommendations)*, Minister of Supply and Services of Canada, 1982, p. 149. This definition of a stock is idealistic. Most stocks are not defined on a genetic basis, although some genetic differentiation is to be expected and has been observed. Furthermore, intermingling does not preclude the existence of separate stocks. As noted above, in order to be recognized as a separate stock, a subpopulation must be sufficiently separate from other subpopulations of the same species for it to be reasonable to treat it as a unit from the perspective of fisheries management and conservation.

and larvae are vulnerable to environmental vicissitudes, and a successful spawning strategy will keep them within an area suitable for their survival.

69. As one moves northeastward along the Scotian Shelf, waters of comparably warmer temperature occur only in increasingly shallow areas. Thus, as they move northeastward, those species that require a minimum temperature for hatching and early-stage development increase the probability that their eggs and larvae will remain in a suitable environment if they attach their eggs to the bottom. This helps retain the young in those shallower areas having temperatures suitable for their survival.

70. The strategy of fastening the eggs to the bottom is particularly suited to those species that live on the Scotian Shelf, a "pass-through" system in which the movement of water is essentially uninterrupted, but that has an irregular topography (a series of banks separated by basins). Many species that are more abundant on Georges Bank and farther to the southwest, but that are present as localized stocks on the Scotian Shelf, deposit their eggs on the bottom (e.g., eelpout, longhorned sculpin, ocean pout, winter flounder, little skate, winter skate, and sea raven).

71. Many fish depend upon water circulation patterns, such as gyres and other similar retention mechanisms, to maintain eggs and larvae within a suitable environment. Over Georges Bank, cod and haddock are at the southwestern limit of their normal range, and the survival of the Georges Bank stocks of these species is dependent upon the existence of the Georges Bank gyre. The results of depending upon the gyre are similar to those achieved by species that lay their eggs on the bottom, but there is a different initial environment for the eggs and larvae. Since they are not attached to the bottom, the eggs, as well as the larvae that hatch from them, depend more upon the conditions and food provided at the surface.

72. In the Gulf of Maine area, the various spawning strategies contribute to the development of separate stocks. Some species use both spawning options (gyres and bottom laying) to varying degrees. On the Scotian Shelf, stocks develop by attaching their eggs and larvae to the bottom of the shallow banks. In the Gulf of Maine Basin, the counter-clockwise gyre helps retain those eggs and larvae that are not deposited on the bottom. Over Georges Bank, eggs and larvae are retained, because they are deposited on the bottom or because of the clockwise gyre over the Bank, or both.

73. The repetitiveness of fish, egg, and larvae distribution data and of stock structures shows that fish concentrations and separate stocks tend to form in certain regions of the Gulf of Maine area. The three general stock

- (122) development regions are indicated in Figure 28¹, on which the Scotian Shelf is shown in green, the Gulf of Maine Basin in black, and Georges Bank in red (extending onto Nantucket Shoals and along the southwestern coast of the Gulf of Maine Basin). Figure 28 shows that, in each of these regions, there are a number of separate areas, associated with particular environmental factors, within which the development of separate stocks is favored. In the Gulf of Maine area, separate stocks tend to be associated with: (1) the gyres and eddies over and around banks and islands, e.g., Georges Bank, Banquereau, Sable Island, and Prince Edward Island; (2) the large eddies found around headlands, e.g., Cape Breton (over St. Anns Bank), and the areas downstream from Cape Sable and Nantucket Shoals; (3) slow moving gyres or areas with little water movement, e.g., in the Gulf of Maine Basin; and (4) frontal areas along the outer edge of the continental shelf where the waters are moving slowly enough to enable larvae to develop before they are swept off into alien environments, e.g., off Sable Island Bank and Georges Bank.

74. The fact that a species divides into separate, relatively independent subpopulations or stocks is important to management and conservation. A fish stock responds as a unit to harvest. Once a stock has been identified, it can be the object of a single set of management policies and regulations. Many of the species found in the Gulf of Maine area long have been recognized as being subdivided into separate stocks.

2. Separate Stocks of Commercially Important Species Have Been Identified With the Separate and Identifiable Regimes of the Scotian Shelf, Georges Bank, and the Gulf of Maine Basin

75. Separate stocks of major fish species in the Gulf of Maine area have been the subjects of international fishery research for over 50 years². During this period, fishery scientists from the United States,

- (122) ¹ Figure 28. A synthesis of the available data on (1) stocks and subpopulations of fish in the area, (2) spawning concentrations of fish, (3) distribution of fish eggs and larvae, and (4) recognized hydrographic features that tend to retain the eggs and larvae of fish within particular areas. The figure shows areas in which separate stocks tend to develop. Separate stocks will not necessarily form in each of the areas; this depends upon the spawning strategy and the environmental preferences of the individual species.

² During the 1930s, scientists from the United States and Canada met jointly to identify fish stocks in the Northwest Atlantic under the North American Council on Fishery Investigations (NACFI). From the 1950s through 1976, identification of fish stocks was pursued in multinational committees of the International Commission for the Northwest Atlantic Fisheries (ICNAF). Since that time, the question has been pursued in the United States by the science and statistical committees for the New England and Mid-Atlantic Regional Fishery Management Councils, in Canada by the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC), and in the international community by the Northwest Atlantic Fisheries Organization (NAFO).

Canada, Denmark, the Federal Republic of Germany, the German Democratic Republic, Great Britain, Japan, Norway, Poland, Portugal, Spain, and the Soviet Union have prepared and reviewed basic genetic studies, tagging studies on fish movements, biological studies of such factors as growth rates and patterns of fish distribution (particularly at spawning time), and studies of the response of subpopulations to fishing. Based upon the accumulated evidence, these scientists reached a consensus on the existence of many separate stocks of commercially important species within the Gulf of Maine area. Table B lists discrete stocks identified in the Gulf of Maine area and the evidence supporting that identification.

i. *Major Stocks Are Separated by the Northeast Channel*

a. Atlantic Cod

76. Research information accumulated since the 1930s confirms that there are separate stocks of cod on Georges Bank, in the Gulf of Maine Basin, and on the Scotian Shelf (including one on Browns Bank). This conclusion is based upon many analyses. Several studies of cod meristics¹ have established measurable differences among the cod stocks in each of these three areas². Tagging studies³ and parasite infestation research⁴ also confirm the separateness of these stocks.

¹ The term "meristics" refers to data that is segmental in character, such as the number of vertebrae or fin rays.

² W. R. Martin, "Identification of Major Groundfish Stocks in Subarea 4 of the Northwest Atlantic Convention Area", *ICNAF Annual Proceedings*, 1953, Vol. 3, pp. 57-61; W. Templeman, "Vertebral Numbers in Atlantic Cod, *Gadus morhua*, of the Newfoundland and Adjacent Areas, 1947-71, and Their Use for Delineating Cod Stocks", in *Journal of Northwest Atlantic Fishery Science*, Vol. 2, 1981, pp. 21-46; W. Templeman, "Divisions of Cod Stocks in the Northwest Atlantic", ICNAF Redbook, Part III, 1962, pp. 79-123. There are measurable differences among cod stocks in other areas of the world, see J. Schmidt, "Racial Investigations. X. The Atlantic Cod (*Gadus callarias* L.) and Local Races of the Same", *Comptes-Rendus des Travaux du Laboratoire Carlsberg*, Vol. 18, No. 6, 1930, pp. 1-33.

³ W. C. Schroeder, "Migrations and Other Phases in the Life History of the Cod Off Southern New England", in United States Bureau of Fisheries, *Bulletin*, Doc. 1081, No. 46, 1930, pp. 1-136; J. P. Wise, "Cod Groups in the New England Area", *Fishery Bulletin*, Vol. 63, No. 1, 1963, pp. 189-203.

⁴ K. Sherman and J. P. Wise, "Incidence of the Cod Parasite *Lernaeocera Branchialis* L. in the New England Area, and its Possible Use as an Indicator of Cod Populations", in *Limnology and Oceanography*, Vol. 6., No. 1, 1961, pp. 61-67.

Table B. Separate Stocks of Commercially Important Species and the Evidence Supporting Their Identification

Species	Stocks	Meristics	Morpho- metrics	Tagging	Parasite work	Growth studies	Peak spawning time	Egg and larval work	Maturity	Recruitment	Biochemical research	Distribution patterns	Abundance trends
Atlantic cod	Georges Bank Gulf of Maine	X ¹	2	X	X	X	X	X				X	X
	Basin ¹	X		X	X	X						X	X
	Browns Bank	X		X	X	X	X					X	X
	Scotian Shelf ¹	X		X	X	X	X	X				X	X
Atlantic herring	Georges Bank Gulf of Maine	X		X	X	X		X			X	X	
	Basin ²	X		X	X			X			X	X	X
	Scotian Shelf ³	X		X	X	X		X			X	X	X
Haddock	Georges Bank Gulf of Maine	X		X	X	X	X	X	X	X		X	X
	Basin	X		X		X						X	X
	Browns Bank	X		X	X	X	X	X	X	X		X	X
	Scotian Shelf	X		X	X	X	X	X				X	X
Silver hake	S. New England- Mid-Atlantic		X										
	Georges Bank Gulf of Maine		X		0 ⁴	X	X				X	X	X
	Basin				0	X						X	X
	Scotian Shelf					X	X				X	X	X
Red hake	S. New England- Mid-Atlantic	X				X						X	
	Georges Bank Gulf of Maine	X				X						X	
	Basin (S.W.)	X				X						X	
	Scotian Shelf	X				X						X	
Redfish	Gulf of Maine												
	Basin	0	0	0	X	X						X	X
	Scotian Shelf	0	0	0	X	X						X	X
Yellowtail flounder	Mid-Atlantic	X	X	X	X	X			X	X		X	X
	S. New England	X	X	X	X	X			X	X		X	X
	Georges Bank	X	X	X	X	X	X	X	X	X		X	X
	Gulf of Maine												
	Basin (S.W.)	X	X	X	X	X			X	X		X	X
	Scotian Shelf ²	X	X		X	X	X	X	X	X		X	X

Table B (continued)

Species	Stocks	Meristics	Morpho- metrics	Tagging	Parasite work	Growth studies	Peak spawning time	Egg and larval work	Maturity	Recruitment	Biochemical research	Distribution patterns	Abundance trends
Scallops	Mid-Atlantic					X				X		X	X
	Georges Bank												
	(Northern Edge & Peak)					X				X		X	X
	Southeast Part					X				X		X	X
	South Channel					X				X		X	X
	Gulf of Maine												
	Basin					X				X		X	X
	Bay of Fundy									X		X	X
	German Bank									X		X	X
	Browns Bank									X		X	X
Lobster	Northumberland												
	Strait									X		X	X
	Georges Bank (and canyons)			X								X	
Mackerel	Browns Bank			X								X	
	Southern	0		X			X				0	X	X
	Northern	0		X			X				0	X	X

¹ "X" indicates that evidence from this category supports the identification of a discrete stock.

² A blank indicates that there is no information available from this category.

³ Indicates several minor stocks.

⁴ "0" indicates that information in this category suggests that there is no separation between stocks, or that there is some disagreement as to such separation.

77. Analyses indicate that each of the separate and identifiable cod stocks on Georges Bank, in the Gulf of Maine Basin, and on the Scotian Shelf has a different growth pattern. Growth curves for different stocks of cod are shown in Figure 29¹. Cod from these areas have different peak spawning times, with the peak on the Scotian Shelf, e.g., occurring one month later than that on Georges Bank². Studies of egg and larval distributions of cod show little, if any, mixing between the stocks of Georges Bank and those of the Scotian Shelf. Figure 30³ shows the principal spawning grounds for cod. Cod larvae distributions for three different years are shown in Figure 31⁴. The areas with which separate stocks of cod have been identified are depicted in Figure 32⁵.

¹ Figure 29. Growth curves for cod from N.E.F.C. data files; growth curves for haddock from J. P. Wise, "Growth Rate of Browns Bank Haddock", United States Fish and Wildlife Service, *Research Report*, No. 50, 1957, pp. 1-13; growth curves for yellowtail flounder from F. E. Lux and F. E. Nichy, "Growth of Yellowtail Flounder, *Limanda ferruginea* (Storer), on Three New England Fishing Grounds", *ICNAF Research Bulletin*, No. 6, 1969, pp. 5-25; growth curves for scallops from G. S. Jamieson, G. Kerr, and M. J. Lundy, "Assessment of Scallop Stocks on Browns and German Banks—1979", Canadian Technical Report of Fisheries and Aquatic Sciences, No. 1014, 1981, pp. iv-17.

² J. B. Colton, W. G. Smith, A. W. Kendall, P. L. Berrien, and M. P. Fahay, "Principal Spawning Areas and Times of Marine Fishes, Cape Sable to Cape Hatteras", *Fishery Bulletin*, Vol. 76, No. 4, 1979, pp. 911-915; deposited with the Court by Canada pursuant to Article 50(2) of the Rules of Court.

³ Figure 30. Spawning grounds for cod are based upon data on the distribution of larvae from the Marine Monitoring Assessment and Prediction (M.A.R.M.A.P.) surveys, for 1977-1980; spawning grounds for herring are based upon data from the Northeast Fisheries Center; spawning grounds for haddock are based upon distribution of larvae from M.A.R.M.A.P. surveys, for 1977-1980; spawning grounds for yellowtail flounder are based upon data on the distribution of eggs for 1977, and larvae for 1977-1980, from M.A.R.M.A.P. surveys.

⁴ Figure 31. Typical distributions of cod larvae based upon data from N.E.F.C. M.A.R.M.A.P. surveys.

⁵ Figure 32. Compilation based upon data from many sources including G. M. Hare, *Atlas of the Major Atlantic Coast Fish and Invertebrate Resources Adjacent to the Canada-United States Boundary Areas*, Canadian Dept. of the Environment, Fisheries and Marine Service, Technical Rpt. No. 681, 1977, p. 1; cited by Canada at para. 106, n. 27, of its Memorial, and deposited with the Court; D. J. Scarratt, ed., *Canadian Atlantic Offshore Fishery Atlas*, Canadian Special Publication of Fisheries and Aquatic Sciences 47 (Rev.), pp. 1, 48-49.

78. Under ICNAF, the division between separate cod stocks at the Northeast Channel was recognized, and the stocks were managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division ¹.

b. Atlantic Herring

79. Atlantic herring is present in the waters from Cape Hatteras to Greenland. It is generally recognized that herring from Georges Bank, the Gulf of Maine Basin, and the Scotian Shelf are divided into a number of separate stocks. Studies of herring meristics show that there are significant differences among the herring stocks of each of the three regimes ². Tagging studies have substantiated the discrete nature of these stocks at time of spawning ³. Similarly, parasite research has confirmed differences in the rate of infestation for herring stocks from Georges Bank and for those from the Scotian Shelf ⁴.

80. Biochemical studies indicate divisions among the herring of Georges Bank, of the western part of the Gulf of Maine Basin, and of the Scotian Shelf ⁵. Numerous growth studies acknowledge differences be-

¹See Appendix A for ICNAF actions and for Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) actions treating cod stocks in Subareas 4 and 5 separately.

²V. C. Anthony and H. C. Boyar, "Comparison of Meristic Characters of Adult Atlantic Herring from the Gulf of Maine and Adjacent Waters", *ICNAF Research Bulletin*, No. 5, 1968, pp. 91-98.

³C. J. Sindermann, "Status of Northwest Atlantic Herring Stocks of Concern to the United States", N.E.F.C. *Technical Series Rep.*, No. 23, 1979, pp. 1-449; W. T. Stobo, "Movements of Herring Tagged in the Bay of Fundy", Update *ICNAF Research Document*, 76/VI/48, Ser. No. 3834, 1976, pp. 1-16; F. P. Almeida and T. S. Burns, "Preliminary Results of the International Herring Tagging Program Conducted on the Northeast Coast of the United States in 1977", National Marine Fisheries Service (N.M.F.S.), N.E.F.C., Laboratory Reference No. 78-07, 1978, pp. 1-33.

⁴Sindermann 1979 *op. cit.*, pp. 1-33; H. C. Boyar and F. E. Perkins, "The Occurrence of a Larval Nematode (*Anisakis* sp.) in Adult Herring from ICNAF Subareas 4 and 5, 1962-1969", *ICNAF Research Document*, 71/99, Ser. No. 2576, pp. 1-2; B. Lubieniecki, "Note on the Occurrence of Larval *Anisakis* in Adult Herring and Mackerel from Long Island to Chesapeake Bay", in *ICNAF Research Bulletin*, No. 10, 1973, pp. 79-81.

⁵G. J. Ridgway, R. D. Lewis and S. W. Sherburne, "Serological and Biochemical Studies of Herring Populations in the Gulf of Maine", in *Rapports et Procès Verbaux, International Council for the Exploration of the Seas (I.C.E.S.)*, Vol. 161, 1971, pp. 21-25.

tween the herring of Georges Bank and those of the Scotian Shelf¹. The location of major spawning grounds for herring long have been recognized along the southwestern Scotian Shelf, in the western portion of the Gulf of Maine Basin, and on the eastern portion of Georges Bank and on Nantucket Shoals². Figure 30 shows the principal spawning grounds for herring. Egg and larvae distributions support this viewpoint³. Herring larvae distributions for three different years are depicted in Figure 33⁴.

81. Atlantic herring in the Gulf of Maine Basin and on Georges Bank spawn in the fall. Farther to the northeast, on the Scotian Shelf, spawning takes place in both the spring and fall. After hatching, the Atlantic herring larvae on Georges Bank rise into the water column and are carried about by the currents. In some areas, especially in estuaries, Atlantic herring larvae move up and down in the water column to reduce the possibility of being carried away. The larvae are retained within the Georges Bank regime by the Georges Bank gyre⁵. Figure 34⁶ shows distributions of herring larvae for a period of six weeks in 1973 and eight weeks in 1974. As they grow and become adults, the members of the Georges Bank stock maintain a consistent pattern of seasonal migration⁷. After spawning, the herring pass round Georges Bank, down the southern New England shelf to the Hudson Canyon, and then return to Georges Bank.

82. Dramatic, and indeed tragic proof of the discreteness of the Georges Bank stock of herring was its collapse in 1976, following years of excessive fishing pressure by foreign fleets⁷. The Georges Bank herring

¹ V. C. Anthony, "Population Dynamics of the Atlantic Herring in the Gulf of Maine", Ph.D. Thesis, University of Washington, 1972, pp. 66-80; V. A. Slepukurov, "The Determination of Parameters of the Growth Equation of Bertalanfy and Preliminary Assessment of the Natural Mortality Rates of Nova Scotian Herring", *ICNAF Research Document*, 75/56, 1975, pp. 1-6; V. C. Anthony and G. Waring, "The Assessment and Management of the Georges Bank Herring Fishery", *Rapports et Procès Verbaux, I.C.E.S.*, Vol. 177, 1980, pp. 72-111.

² H. C. Boyar, R. R. Marak, F. E. Perkins, and R. A. Clifford, "Seasonal Distribution and Growth of Larval Herring (*Clupea harengus* L.) in the Georges Bank-Gulf of Maine Area from 1962 to 1970", *Journal du Conseil (I.C.E.S.)*, Vol. 35, No. 1, 1973, pp. 36-51.

(125) ³ Figure 33. Typical distributions of herring larvae based upon data from the N.E.F.C./M.A.R.M.A.P. surveys.

⁴ This retention occurs although the Georges Bank gyre is not as strong in the cooler months of the year.

⁵ Figure 34. Typical progression of herring larvae distributions based upon N.E.F.C./M.A.R.M.A.P. surveys.

⁶ V. N. Zinkevich, "Observations on the Distribution of Herring, *Clupea harengus* L., on Georges Bank and in Adjacent Waters in 1962-65", in *ICNAF Research Bulletin*, No. 4, 1967, pp. 101-115.

⁷ See Canadian Memorial, para. 191.

stock never has recovered from this abuse, while the neighboring herring stocks are prospering. This history confirms the lack of exchange between the Georges Bank herring stocks and the other herring stocks in the Gulf of Maine area. In this regard, note the difference, in Figure 33, between distributions of herring larvae in 1973 and 1974, on the one hand, and in 1980, on the other. Figure 35¹ depicts areas with which separate stocks of herring have been identified.

83. Under ICNAF, the division between herring stocks at the Northeast Channel was recognized, and the stocks were managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division².

c. Haddock

84. Haddock are found in commercially important concentrations from the waters off Cape Cod to the Grand Banks. An extensive research data base, accumulated since 1930, confirms that separate and identifiable stocks of this species are found on Georges Bank, in the Gulf of Maine Basin, and on the Scotian Shelf. Investigators have also reached this conclusion, based upon meristic studies³. A wealth of tagging studies further indicate the separate nature of these stocks⁴. Additionally, research on a swim bladder parasite that attacks haddock shows a higher rate of infestation for Scotian Shelf haddock than for Georges Bank haddock⁵. Measurable differences in growth rates indicate that Scotian

¹ Figure 35. Compilation based upon data from many sources including Hare, *op. cit.*, p. 6; and Scarratt, *op. cit.*, pp. 80-81.

² See Appendix B for ICNAF actions and for Canadian (CAFSAC) actions treating herring stocks in Subareas 4 and 5 separately.

³ Martin, *op. cit.*; J. R. Clark and V. D. Vladykov, "Definition of Haddock Stocks of the Northwestern Atlantic", in *Fishery Bulletin* 169, Vol. 60, 1960, pp. 283-296.

⁴ A. W. H. Needler, "The Migrations of Haddock and the Interrelationships of Haddock Populations in North American Waters", *Contributions to Canadian Biology and Fisheries*, New Series, Vol. 6, No. 8, 1930, pp. 243-313; W. C. Schroeder, "Results of Haddock Tagging in the Gulf of Maine from 1923 to 1932", in *Journal of Marine Research*, Vol. 5, No. 1, 1942, pp. 1-19; F.D. McCracken, "Studies of Haddock in the Passamaquoddy Bay Region", in *Journal of the Fisheries Research Board of Canada*, Vol. 17, 1960, pp. 175-179; M. D. Grosslein, "Haddock Stocks in the ICNAF Convention Area", ICNAF Redbook, Part III, 1962, pp. 124-131; R. G. Halliday and F. D. McCracken, "Movements of Haddock Tagged off Digby, Nova Scotia", *ICNAF Research Bulletin*, No. 7, 1970, pp. 8-14.

⁵ P. H. Odense and V. H. Logan, "Prevalence and Morphology of *Eimeria gadi* (Fiebiger, 1913) in the Haddock", in *Journal of Protozoology*, Vol. 23, No. 4, 1976, pp. 564-571.

Shelf haddock grow more slowly than those from either Georges Bank or the Gulf of Maine Basin¹. Growth curves for different haddock stocks are shown in Figure 29, *supra*. Haddock from Georges Bank mature more quickly and spawn at earlier ages than do haddock from the Scotian Shelf². As with cod, peak spawning time on Browns Bank occurs about one month later than on Georges Bank³. Figure 30, *supra*, shows the principal spawning grounds for haddock. Research surveys show little exchange of haddock eggs and larvae between Georges Bank and Browns Bank. Figure 36⁴ depicts the distribution of haddock larvae for three different years. Figure 37⁵ indicates the areas with which separate stocks of haddock have been identified.

85. The conservation and management of the haddock stocks in the Gulf of Maine area was a primary reason for the creation of ICNAF⁶. Under ICNAF, the division between haddock stocks at the Northeast Channel was recognized, and the stocks were managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division⁷.

d. Silver Hake

86. Silver hake (also known as whiting) are distributed in commercial concentrations from the waters off the Carolinas to the Gulf of St. Lawrence⁸. Since the early 1970s, fisheries-management organizations

¹ H. W. Graham, "Mesh Regulation to Increase the Yield of the Georges Bank Haddock Fishery", ICNAF, Second Annual Report, 1951-1952, Part 3, 1952, pp. 23-33; H. Thompson, "The Occurrence and Biological Features of Haddock in the Newfoundland Area", in Research Bulletin No. 6, Newfoundland Dept. of Natural Resources, 1939, pp. 7 *et seq.*

² Fishermen and fish dealers are able to distinguish readily between Georges Bank haddock and Browns Bank haddock. Browns Bank haddock are sleeker in appearance.

³ M. D. Grosslein and R. C. Hennemuth, "Spawning Stock and Other Factors Related to Recruitment of Haddock on Georges Bank", in *Rapports et Procès Verbaux, I.C.E.S.*, Vol. 164, 1973, pp. 77-88; Colton, *et al.*, *op. cit.*

⁴ Figure 36. Typical distributions of haddock larvae based upon data from the N.E.F.C./M.A.R.M.A.P. surveys.

(127) ⁵ Figure 37. Compilation based upon data from many sources, including Grosslein, *op. cit.*; Hare, *op. cit.*, p. 2; and Scarratt, *op. cit.*, pp. 50-51.

⁶ See Annex 3, Vol. II, The Activities of the Parties under the International Convention for the Northwest Atlantic Fisheries (ICNAF), Chapter I.

⁷ See Appendix C for ICNAF actions and for Canadian (CAFSAC) actions treating haddock stocks in Subareas 4 and 5 separately.

⁸ A. H. Leim and W. B. Scott, *Fishes of the Atlantic Coast of Canada*, Fisheries Research Board of Canada Bulletin No. 155, 1966, pp. 205-208.

have recognized four separate stocks of silver hake associated respectively with the Scotian Shelf, Georges Bank, the Gulf of Maine Basin, and the southern New England-to-mid-Atlantic shelf. Biochemical analyses have served to distinguish these separate stocks¹. Several scientists have examined growth patterns for silver hake from Georges Bank, the Gulf of Maine Basin, and the Scotian Shelf, and have concluded that there are significant differences among fish from these three areas². Spawning takes place from late spring to autumn in this species, but progresses from south to north as water temperatures warm. Peak spawning usually occurs in July and August in areas to the south, and in August and September in the more northern areas³. Spawning is concentrated in certain areas along the outer edge of the continental shelf from southern and southwestern Georges Bank to eastern Long Island, and on Sable Island Bank on the Scotian Shelf. Substantial spawning also takes place along the coastal region of the Gulf of Maine Basin from Cape Cod to Grand Manan Island. Figure 38⁴ indicates the areas with which separate stocks of silver hake have been identified.

87. Under ICNAF, the division between silver hake stocks at the Northeast Channel was recognized, and the stocks were managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division⁵.

¹ K. G. Konstantinov and A. S. Noskov, USSR Research Report, 1968, *ICNAF Research Document* 69/17, 1969, pp. 1-29; F. P. Almeida, "Determination of the von Bertalanffy Growth Equation for the Southern New England-Middle Atlantic, Georges Bank and Gulf of Maine Stocks of Silver Hake", N.E.F.C. Woods Hole Laboratory Reference No. 78-13, 1978, pp. 1 *et seq*; R. Schenck, "Population Identification of Silver Hake (*Merluccius bilinearis*) Using Isoelectric Focusing", N.E.F.C. Woods Hole Laboratory Reference No. 81-44, 1981, pp. 1-32.

² Almeida, *op. cit.*; J. J. Hunt, "Age, Growth and Distribution of Silver Hake, *Merluccius bilinearis*, on the Scotian Shelf", *ICNAF Selected Papers*, No. 3, 1978, pp. 33-44.

³ Colton, *et al.*, *op. cit.*

(128) ⁴ Figure 38. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 3; Scarratt, *op. cit.*, pp. 54-55; M. D. Grosslein and T. R. Azarovitz, *Fish Distribution*, 1982, pp. 72-74.

⁵ See Appendix D for ICNAF actions and for Canadian (CAFSAC) actions treating silver hake stocks in Subareas 4 and 5 separately.

e. Red and White Hake

88. Red and white hake are frequently treated as though they were one species¹. The distribution of red hake in the Northwest Atlantic ranges from the waters off southern Labrador to those off North Carolina, but commercial concentrations are found, for the most part, on Georges Bank and on the southern New England shelf². White hake is similar to red hake in behavior and distribution, although white hake clearly prefers deeper water. Examination of meristic characters and otolith³ growth patterns indicates that the Scotian Shelf, the southwestern portion of the Gulf of Maine Basin, Georges Bank, and the region from the southern New England to the mid-Atlantic shelf each has a separate stock of red hake⁴. Bottom trawl survey data⁵ generally confirms the separateness of these stocks. It is reasonable to assume that white hake has a similar stock structure to red hake. There is also evidence that the growth rates of red and white hake from each of these areas are different⁶. Figure 39⁷ indicates the areas with which separate stocks of red and white hake have been identified.

¹ In their discussion of red hake, Leim and Scott noted that:

"Many authorities recognize 2 species of hake, *U. tenuis* (white hake) and *U. chuss* (red or squirrel hake). They are said to differ mainly in the number of rows of scales between the gill opening and the base of the caudal fin, in the length of the filamentous dorsal ray, in the length of the pelvic fins, and in the position of the posterior angle of the mouth. Canadian specimens show so much variation and overlapping in the first three of these characters that Vladikov and McKensie and Battle considered *U. tenuis* and *U. chuss* to be one species. Because of the resulting confusion, the two species are here treated together . . .".

Op. cit., p. 217. [Citations omitted.]

² Leim and Scott, *op. cit.*, pp. 217-219.

³ "Otoliths" are small bones that are found in the skulls of fish, and are often referred to as ear bones. Because of their structure, they are useful for many biological studies, including research concerned with determining the stock structure of a species, or the rate of growth of a fish.

⁴ V. A. Richter, "Results of Research on the Distribution, Age, Growth and General Mortality of Stocks of Red Hake, *Urophycis chuss* Walbaum, on Georges Bank and in Adjacent Waters, 1965-1966", *ICNAF Research Document* 68/38, 1968, pp. 1-16. There is a degree of mixing between individual members of the stocks associated with Georges Bank and the southern New England-mid-Atlantic region.

⁵ E. D. Anderson, "Comments on the Delineation of Red and Silver Hake Stocks in ICNAF Subarea 5 and Statistical Area 6", *ICNAF Research Document*, 74/100, 1974, pp. 1-8.

⁶ Richter, n. 4, *supra*; V. A. Richter, "Dynamics of some Biological Indices, Abundance and Fishing of Red Hake (*Urophycis chuss* W.) in the Northwest Atlantic, 1965-1968", *ICNAF Research Document* 70/39, 1970, pp. 1-14.

⁷ Figure 39. Compilation based upon data from many sources, including Hare, *op. cit.*, pp. 3-4; and Scarratt, *op. cit.*, pp. 58-59.

89. Under ICNAF, the division between red hake stocks at the Northeast Channel was recognized, and the stocks were managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division¹. Under ICNAF, white hake in Subarea 5 and Statistical Area 6 were treated as "other finfish". This had the effect of treating white hake in Subarea 5 and Statistical Area 6 as separate from those in Subarea 4².

f. Redfish

90. Redfish³ in the Gulf of Maine Basin and on the Scotian Shelf consistently have been treated as separate stocks. This species exhibits little, if any, migratory behavior⁴. The evidence of parasite studies indicates that Gulf of Maine Basin redfish are distinct from those of the Scotian Shelf⁵. Growth information from several studies shows that Scotian Shelf redfish have slower growth rates⁶. Figure 40⁷ indicates the areas with which separate stocks of redfish have been identified.

91. Under ICNAF, the stock division between the redfish in Subarea 5 and the redfish in Subarea 4 was recognized, and the stocks were

¹ See Appendix E for ICNAF actions and for Canadian (CAFSAC) actions treating red hake stocks in Subareas 4 and 5 separately.

² Canada also recognized the existence of separate white hake stocks in taking the following action: TAC for 4T white hake for 1983 (CAFSAC Adv. Doc. 82/13).

³ Some authorities are of the opinion that more than one *species* of redfish exist in the Gulf of Maine area.

⁴ G. F. Kelly and A. B. Barker, "Observations on the Behaviour, Growth, and Migration of Redfish at Eastport, Maine", *Rapports et Procès Verbaux, I.C.E.S.*, Vol. 150, 1961, pp. 263-275.

⁵ W. Templeman and H. J. Squires, "Incidence and Distribution of Infestation by *Sphyrion lumpi* (Kroyer) on the Redfish, *Sebastes marinus* (L.), of the Western North Atlantic", in *Journal of the Fisheries Research Board of Canada*, Vol. 17, No. 1, 1960, pp. 9-31; C. J. Sindermann, "Parasitological Tags for Redfish of the Western North Atlantic", *Rapports et Procès Verbaux, I.C.E.S.*, Vol. 150, 1961, pp. 111-117.

⁶ R. K. Mayo, "Exploitation of Redfish, *Sebastes marinus* (L.), in the Gulf of Maine-Georges Bank Region, with Particular Reference to the 1971 Year-Class", in *Journal of Northwest Atlantic Fisheries Science*, Vol. 1, 1980, pp. 21-37; A. Perlmutter and G. M. Clarke, "Age and Growth of Immature Rosefish (*Sebastes marinus*) in the Gulf of Maine and off Western Nova Scotia", *Fishery Bulletin* 45, 1949, pp. 207-228; R. K. Mayo and D. S. Miller, "A Preliminary Assessment of the Redfish, *Sebastes marinus* (L.), in ICNAF Divisions 4VWX", *ICNAF Selected Papers*, No. 1, 1976, pp. 31-39.

⁷ Figure 40. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 2, and Scarratt, *op. cit.*, pp. 58-59.

managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division ¹.

g. Yellowtail Flounder

92. Numerous studies have examined the various stocks of yellowtail flounder that are found in the waters from the mid-Atlantic shelf to the Scotian Shelf. These studies indicate that there are separate stocks associated with the Scotian Shelf, with Georges Bank, with the southwestern Gulf of Maine Basin, with the southern New England shelf, and with the mid-Atlantic shelf, respectively. Meristic and morphometric research confirms different stocks for each of these areas ², as do tagging studies ³. The latter reflect some movement of yellowtail flounder between Georges Bank and areas to the southwest, but none between the separate populations of Georges Bank and of the Scotian Shelf. Parasite studies have not distinguished southern New England yellowtail from those on Georges Bank, but have confirmed that there are yellowtail flounder stocks for the southwestern Gulf of Maine Basin that are separate from those on Georges Bank and the southern New England shelf ⁴. Several investigations of the growth rates of yellowtail flounder all found major differences in these rates for fish from the Scotian Shelf, from Georges Bank, and from areas to the southwest ⁵. Growth curves for different stocks of yellowtail flounder are shown in Figure 29, *supra*. The evidence suggests that southern stocks mature earlier in comparison to their northern counterparts ⁶. The spawning areas for these stocks are

¹ See Appendix F for ICNAF actions and for Canadian (CAFSAC) actions treating redfish stocks in Subareas 4 and 5 separately.

² D. M. Scott, "A Comparative Study of the Yellowtail Flounder from Three Atlantic Fishing Areas", in *Journal of the Fisheries Research Board of Canada*, Vol. 11, No. 3, 1954, pp. 171-197; F. E. Lux, "Identification of New England Yellowtail Flounder Groups", in *Fishery Bulletin*, Vol. 63, No. 1, 1963, pp. 1-10.

³ W. F. Royce, R. J. Buller, and E. D. Premetz, "Decline of the Yellowtail Flounder (*Limanda ferruginea*) off New England", in *Fishery Bulletin*, Vol. 59, No. 146, 1959, pp. 169-267; Lux, *op. cit.*

⁴ Lux, *op. cit.*

⁵ Scott, *op. cit.*; T. K. Pitt, "Age Composition and Growth of Yellowtail Flounder (*Limanda Ferruginea*) from the Grand Bank", in *Journal of the Fisheries Research Board of Canada*, Vol. 31, 1974, pp. 1800-1802.

⁶ Scott, *op. cit.*; Royce, *et al.*, *op. cit.*; W. H. Howell and D. H. Kesler, "Fecundity of the Southern New England Stock of Yellowtail Flounder, *Limanda Ferruginea*", in *Fishery Bulletin*, Vol. 75, No. 4, 1977, pp. 877-880.

separate. Figure 30, *supra*, shows the principal spawning grounds for yellowtail flounder. Spawning in this species usually begins in spring, peaking in April and May on Georges Bank, and in June on Browns Bank¹. Eggs and larvae of this species spawned on the Scotian Shelf are separated at the Northeast Channel from those on Georges Bank. Figure 41² depicts the yellowtail flounder larval distribution for each of three years. Figure 42³ indicates the areas with which separate stocks of yellowtail flounder have been identified.

93. Under ICNAF, the stock division between yellowtail stocks at the Northeast Channel was recognized, and the stocks were managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division⁴.

h. Sea Scallops

94. The Atlantic sea scallop *Placopecten magellanicus* is found in the Northwest Atlantic Ocean from the Strait of Belle Isle in Canada to Cape Hatteras, North Carolina⁵. Separate sea scallop stocks are found in the Northumberland Strait, on the Scotian Shelf (e.g. on Browns Bank, on German Bank, and in the area of Sable Island), in the Bay of Fundy, in the Gulf of Maine Basin, on Georges Bank (e.g. on the northern edge and northeast peak of Georges Bank, on the southeast part of Georges Bank, and in the Great South Channel area of Georges Bank), and in the Middle Atlantic Bight. Adult scallops are only capable of moving short distances within the beds⁶. There do not appear to be correlations in recruitment among sea scallop beds⁷. Growth rates differ among the

¹ Colton, *et al.*, *op. cit.*; P. Berrien, "Yellowtail Flounder, *Limanda Ferruginea*, Estimates of Egg Abundance and Population Size During Spring 1977 in Gulf of Maine, Georges Bank, Southern New England and Middle Atlantic Bight Waters", I.C.E.S. document presented to Demersal Fish Committee, 1981/G:65, 1981, pp. 1-19.

² Figure 41. Typical distributions of yellowtail flounder larvae based upon data from N.E.F.C./M.A.R.M.A.P. surveys.

³ Figure 42. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 5; and Scarratt, *op. cit.*, pp. 72-73.

⁴ See Appendix G for ICNAF actions and for Canadian (CAFSAC) actions treating yellowtail stocks in Subareas 4 and 5 separately.

⁵ J. A. Posgay, "The Range of the Sea Scallop", in *The Nautilus*, Vol. 71, No. 2, 1957, pp. 56-57.

⁶ J. A. Posgay, "Movement of Tagged Sea Scallops on Georges Bank", in *Marine Fisheries Review*, Vol. 43, No. 4, 1981, pp. 19-25.

⁷ This means that, each year, the number of young per unit area that settle varies from scallop bed to scallop bed.

separate areas¹. Figure 29, *supra*, depicts growth curves for different stocks of sea scallops. Although the major offshore scallop beds tend to be isolated geographically, sea scallop eggs and larvae are planktonic, and can be transported long distances during their pelagic phase². Larvae spawned on Georges Bank are frequently retained over the Bank by its gyre³.

(131) 95. Because, however, some surface water breaks free of the Georges Bank gyre and flows southwestward to Nantucket Shoals, scallop eggs and larvae can be carried off Georges Bank toward the southern New England continental shelf⁴. The sea scallops in the Middle Atlantic Bight form a dependent population that relies upon larval export from Georges Bank⁵. Water-current patterns do not support the movement of scallop eggs and larvae between Browns Bank, on the Scotian Shelf, and Georges Bank. Figure 43⁶ indicates the areas with which separate stocks of scallops have been identified.

96. Under ICNAF, the division between scallop stocks at the Northeast Channel was recognized, and scallops were managed accordingly. Since extending their respective fisheries jurisdictions to 200 nautical miles, the United States and Canada have continued to recognize that division⁶.

¹ F. M. Serchuk, "Growth, Shell Height - Meat Weight and Yield Per Recruit Relationships of Northwest Atlantic Sea Scallop Populations", N.E.F.C. Staff Study, 1982.

² F. M. Serchuk, P. W. Wood, J. A. Posgay, and B. E. Brown, "Assessment and Status of Sea Scallop (*Placopecten Magellanicus*) Populations off the Northeast Coast of the United States", proceedings of the National Shellfisheries Association, Vol. 69, 1979, pp. 161-191.

³ Serchuk, *et al.*, *ibid.*; J. A. Posgay, "Population Assessment of the Georges Bank Sea Scallop Stocks", *Rapports et Procès Verbaux des Réunions, I.C.E.S.*, Vol. 175, 1979, pp. 109-113; A. S. Merrill and R. L. Edwards, "Observations on Mollusks from a Navigation Buoy with Special Emphasis on the Sea Scallop *Placopecten Magellanicus*", in *The Nautilus*, Vol. 90, No. 1, 1976, pp. 54-61.

⁴ F. M. Serchuk and R. S. Rak, "Biological Characteristics of Offshore Gulf of Maine Sea Scallop Populations: Size Distributions, Shell Height-Meat Weight Relationships and Relative Fecundity Patterns", N.E.F.C. Woods Hole Laboratory Reference Document No. 83-07, 1983.

(131) ⁵ Figure 43. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 8; and Scarratt, *op. cit.*, pp. 36-37.

⁶ See Appendix H for ICNAF actions and Canadian (CAFSA) actions treating scallop populations in Subareas 4 and 5 separately.

i. Lobster

97. Research concerning the migratory behavior, population structure, and ecology of offshore lobster supports the conclusion that the lobster stocks found on Georges Bank (and in the Georges Bank canyons) and on Browns Bank, on the Scotian Shelf, are separate and identifiable¹. Migration studies conducted from the late 1960s through the 1970s confirm that there is little movement of lobster across the Northeast Channel. None of the tagged lobster released in the vicinity of Corsair Canyon, on the seaward edge of Georges Bank, was recovered on the northeast side of the Channel. Furthermore, only 1.7 per cent of those lobster released on Browns Bank were recovered on the southwest side of the Channel. The heads of the canyons on Georges Bank are believed to represent "home territory" for the New England offshore lobster population, from which 30 to 50 per cent migrate in a west-to-northwest direction in the spring and early summer. These lobster migrate to warm, shallow water to complete the reproductive cycle, then return to the canyon heads in late summer and fall². Extensive studies of the biology of the Georges Bank canyons, conducted from manned submersibles over the past 10 years, support this conclusion. Figure 44³ indicates the areas with which separate stocks of lobster have been identified. ICNAF did not attempt to manage lobster, because most States regarded them as creatures of the continental shelf to be managed by the coastal State.

j. Cusk

98. The spawning and distributional evidence strongly suggests that separate stocks of cusk exist in the western part of the Gulf of Maine Basin and on the Scotian Shelf, including Browns Bank and German Bank. Bigelow and others report that cusk spawn in spring and early summer in the Gulf of Maine area⁴. Others report that spawning occurs from April through July along the western and southern margins of the Gulf of

¹ J. R. Uzmann, R. A. Cooper, and K. J. Pecci, "Migration and Dispersion of Tagged American Lobsters, *Homarus americanus*, on the Southern New England Continental Shelf", N.O.A.A. Technical Report N.M.F.S., SSRF-705, 1977, pp. 1-92; R. A. Cooper and J. R. Uzmann, "Migrations and Growth of Deep-Sea Lobsters, *Homarus americanus*", in *Science*, Vol. 171, 1971, pp. 288-290; R. A. Cooper and J. R. Uzmann, "Ecology of Juvenile and Adult *Homarus*", *The Biology and Management of Lobsters*, Vol. 2, 1980, pp. 97-140.

² Cooper and Uzmann, 1980, *ibid*.

(132) ³ Figure 44. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 8; Scarratt, *op. cit.*, pp. 34-35; and Cooper and Uzmann, 1971, *op. cit.*

⁴ Bigelow and Schroeder, *op. cit.*, pp. 238-243; Leim and Scott, *op. cit.*, pp. 191-192.

Maine Basin, with peak activity in April and May¹. Fish ready to spawn have been found from May through August on the southwestern Scotian Shelf, with peak activity occurring toward the end of June². Egg and larval distribution plots suggest that spawning by cusk occurs progressively later from the Gulf of Maine Basin northeastward along the Scotian Shelf. Figure 45³ shows the pattern of cusk concentrations in the Gulf of Maine area. ICNAF did not treat cusk separately, because they were not the object of a directed fishery.

k. Longfin Squid

99. As with the fish discussed in the preceding paragraphs, the longfin (*Loligo*) squid tends not to appear in the Northeast Channel. Nevertheless, unlike the fish species described above, which have *stock* divisions at the Northeast Channel, the longfin squid, as a *species*, tends not to progress north of the Northeast Channel. The longfin squid is a member of the fourspot flounder-butterfish association, which prefers warm waters. Consequently, it rarely moves north beyond Georges Bank, although longfin squid occasionally are found in the Bar Harbor region along the coast of Maine. Figure 46⁴ shows the distribution of longfin squid. Prior to 1975, ICNAF treated longfin together with shortfin squid. Longfin squid were first assessed separately in 1975. A quota for longfin in Subarea 5 and Statistical Area 6 was imposed for 1976. No quota was set for longfin in Subarea 4, because they do not usually venture beyond Georges Bank.

ii. Some Fish Populations Cross All Possible Boundaries in the Gulf of Maine Area

a. Mackerel

100. Mackerel are found in the Northwest Atlantic between Labrador and North Carolina. A mid-Atlantic group lives and spawns in the region between Cape Hatteras and Georges Bank. There is some evidence that the mackerel stock that spawns in the Gulf of St. Lawrence winters in the mid-Atlantic region⁵. There is also evidence, in Canadian groundfish data, that mackerel, probably from the Gulf of St. Lawrence stock, are present during the colder months of the year in the offshore Scotian Shelf area. Tagging experiments suggest that there are northern and southern stocks of mackerel⁵. May is the peak spawning time for the southern New

¹ Colton, *et al.*, *op. cit.*

² W. S. Oldham, "Biology of Scotian Shelf Cusk, *Brosme brosme*", *ICNAF Research Bulletin*, No. 9, 1972, pp. 85-98.

(133) ³ Figure 45. Compilation based upon data from many sources, including Leim and Scott, *op. cit.*, pp. 191-192; and N.E.F.C. and Canadian groundfish survey data.

(134) ⁴ Figure 46. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 7; and N.E.F.C. groundfish survey data.

⁵ O. E. Sette, "Biology of the Atlantic Mackerel (*Scomber scombrus*) of North America, Part II: migrations and habits", in *Fishery Bulletin*, Vol. 51, No. 49, 1950, pp. 251-358.

England and Georges Bank stock, while July is the peak spawning time for the Gulf of St. Lawrence stock¹. Figure 47² indicates the areas with which the southern and northern stocks of mackerel have been identified³.

b. Pollock

101. Pollock have similar distribution and concentration patterns to cod and haddock, although, unlike cod and haddock, they tend to favour water of intermediate depths, rather than that at the bottom. As with cod and haddock, pollock concentrate around the rim of the Gulf of Maine Basin. As evidenced by cruise data and egg and larvae surveys, spawning concentrations are found around Stellwagen Bank in the western Gulf of Maine Basin, in the Nantucket Shoals area, and along the northeastern edge of Georges Bank. Additional spawning concentrations are formed at the southwestern tip of the Scotian Shelf, in the area of Sable Island Bank, and off Cape Breton on the Scotian Shelf. The spawning concentrations are in areas known in other cases to promote the development of separate stocks⁴. Survey cruise data indicate that pollock generally avoid the Northeast Channel. Figure 48⁵ shows the areas in which pollock concentrate to spawn.

c. Argentine

102. The argentine shows a preference for deep water with relatively high salinity. The argentine is found along the continental shelf slope in the Gulf of Maine area, in the deeper waters of the Gulf of Maine Basin,

¹ Sette, *ibid.*; D. M. Ware, "Spawning Time and Egg Size of Atlantic Mackerel, *Scomber scombrus*, in Relation to the Plankton", in *Journal of the Fisheries Research Board of Canada*, Vol. 34, 1977, pp. 2308-2315; Colton, *et al.*, *op. cit.*

² Figure 47. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 6.

³ Meristic and biochemical studies have not established differences between the northern and southern stocks of mackerel; K. T. MacKay and E. T. Garside, "Meristic Analyses of Atlantic Mackerel, *Scomber scombrus*, from the North American Coastal Populations", in *Journal of the Fisheries Research Board of Canada*, Vol. 26, No. 9, 1969, pp. 2537-2540; K. T. MacKay, "An Ecological Study of Mackerel, *Scomber scombrus* (Linnaeus), in the Coastal Waters of Canada", Fisheries Research Board of Canada Technical Report No. 31, 1967, pp. ii-127.

(122) ⁴ See Figure 28, discussed above, showing areas in which separate stocks tend to form.

⁵ Figure 48. Compilation based upon data from many sources, including Hare, *op. cit.*, pp. 2-3; Scarratt, *op. cit.*, pp. 56-57; and N.E.F.C. and Canadian groundfish survey data.

and in the deeper basins on the Scotian Shelf. Figure 49¹ shows the distribution of argentine.

d. Shortfin Squid

103. During the winter months, the shortfin (*Illex*) squid is found only along the edge of the continental shelf, in the water over the continental slope. During the warmer months, it is widely distributed throughout the Gulf of Maine area, and does not tend to concentrate in any particular region. Figure 50² shows the wide distribution of shortfin squid throughout the Gulf of Maine area.

SECTION 2. Biogeographers Recognize a Faunal Boundary that Separates the Georges Bank Regime from the Scotian Shelf Regime

104. The science of biogeography draws broad generalizations about the distribution of organisms in relation to temperature and other climatic variables. On the western coast of the North Atlantic Ocean, the climatic conditions from New Jersey to the northeastern end of Nova Scotia correspond to those on the eastern side of the Atlantic Ocean between the northern part of Africa and the northern part of Europe. Thus, changes in ocean climate that occur on the eastern side of the Atlantic over an area within some 40 degrees of latitude are compressed, on the western side, into an area within less than 10 degrees of latitude. Figure 51³.

105. Various authorities have noted the confusing terminology applied to the biogeography of the Gulf of Maine area⁴. Some of the confusion stems from the large seasonal variations in water temperature in this area. See Figure 9, *supra*, depicting bottom temperatures. These seasonal temperature variations are due largely to the compression of atmospheric influences into a narrow latitudinal zone. In this zone, summer temperatures are influenced by the passage of subtropical air masses, and winter temperatures by the passage of cold, dry, arctic air masses. The water temperatures and their seasonal changes are important to the distribution and relative abundance of marine organisms in any part of the region.

¹ Figure 49. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 5; and Scarratt, *op. cit.*, pp. 46-47.

² Figure 50. Compilation based upon data from many sources, including Hare, *op. cit.*, p. 7; and N.E.F.C. and Canadian groundfish survey data.

³ Figure 51. Surface temperatures for the week of 13 June 1982. Data from N.O.A.A. polar orbiting satellites carrying the Advanced Very High Resolution Radiometer, from chart provided by the National Environmental Satellite and Data Information Service.

⁴ One such authority is Hazel, quoted by Canada in its Memorial, at para. 97, n. 21. In his discussion of ostracode zoogeography, he states: "[b]ecause these authors apply different terms to the same climates and most agree as to the placement of the major biogeographic boundaries, the different usage of climatic terms is basically a confusing battle of words." J. E. Hazel, *Atlantic Continental Shelf and Slope of the United States — Ostracode Zoogeography in the Southern Nova Scotian*

(footnote continued on following page)

106. Faunal barriers, as they are referred to in biogeographic studies, represent a sweeping approach to the identification of factors that influence the distribution of organisms in various regions of the world¹. As discussed above, the living organisms in the Gulf of Maine area have responded in various ways to the options offered them by the various topographic features and complex oceanographic regimes in the area.

107. It is well recognized that there is a major faunal boundary that runs at about 42 degrees North Latitude from Cape Cod, northeastward along the northern edge of Georges Bank, and through the Northeast Channel. This faunal boundary has been recognized, e.g., in studies of the distribution of fish, starfish, and molluscs. In his book *Natural Communities*, Dice recognized the division that extends from Cape Cod along the northern edge of Georges Bank through the Northeast Channel². Although he was concerned principally with terrestrial environments, Dice recognized two provinces in the area: the first north and east of Georges Bank, and the second to the south.

(footnote continued from previous page)

and Northern Virginian Faunal Provinces, Geological Survey Professional Paper 529-E, 1970, p. E9. To assist others in understanding this "confusing battle of words", Hazel reviewed the biogeographic (Figure 4, p. E7) and climatic terminology (Figure 6, p. E9). He chose to use the terms "Nova Scotian" and "Virginian" for the two biogeographic regions in the Gulf of Maine area, and the terms "cold temperate" and "mild temperate" for the marine climatic zones. Unfortunately, subsequent authors have continued to foster confusion in both categories, although they agree that the principal faunal barrier in the area runs from Cape Cod east along the northern edge of Georges Bank, thence seaward through the Northeast Channel. This annex avoids the use of ecological terms where they serve no purpose. For example, the use of the term "biotic" province implies an emphasis on geography and taxonomy, while another commonly used term "biome" emphasizes climatic adaptations. In the marine environment all elements are present, and there is no single, fully useful term under the circumstances. Marine organisms are more responsive to their physical climatic ambience than are terrestrial animals, and have an unusual ability to respond as a community to the differing conditions in which they find themselves. Climatic adjustment is the overriding factor in the Gulf of Maine area, although the geographic, taxonomic, and climatic boundaries in this area are concordant. There is a pronounced relationship between depth and temperature. Thus a species responding to temperature will also appear to respond to depth, although depth may not be a direct causal factor in determining the distribution of the species. The distances involved in the Gulf of Maine area are often insufficient to determine which factor, temperature or depth, is the prime determinant.

¹ Because of its broad approach, biogeography tends to deal with groups of species, and therefore is less useful than stock identification as a tool in the management and conservation of commercial resources.

² Dice, *op. cit.*, p. 444, Figure 50.

108. All subsequent authorities, regardless of the terms used for the different regions, identify the northern edge of Georges Bank and the Northeast Channel as the significant faunal boundary in the area. For example, Bousfield and Thomas, in a 1975 study prepared for the Nova Scotia Institute of Science, included an illustration of the "present pattern of faunal distributions" in the Gulf of Maine area¹. This illustration, which the authors also described as showing the "principal hydrological and zoogeographical features of the region", as well as surface temperatures "grouped in four categories of zoogeographical significance, indicated by colour", is reproduced here as Figure 52². The authors identified the southern limit of the "boreal" (green) region as running through the Gulf of Maine Basin, then along the northeastern edge of Georges Bank and through the Northeast Channel³. They identified the yellow and red regions to the south of this limit as being "warm-water" regions⁴.

109. Franz and Merrill examined the ranges of various molluscan faunal groups from Cape Hatteras (35 degrees North Latitude) to Northern Labrador (60 degrees North Latitude)⁵. Figure 53, reproduced from their paper, illustrates the conclusions of their examination⁶. The significant break in the distribution of the various faunal groups occurs at the Northeast Channel. The species group labelled "Arctic-Boreal" abruptly declines between 43 and 41 degrees North Latitude. Similarly, the "Transhatteran" faunal group declines in its northward distribution at the same point.

110. Franz, Worley, and Merrill found similar breaks in the distribution of seastars⁷. In their summary remarks, the authors state:

"The distribution patterns of seastars re-emphasize an important point: for continental shelf species, Cape Hatteras and Cape Cod, *per se*, are not barriers. Thermal discontinuities associated with the confluence of surface currents, and influenced by the

¹ E. L. Bousfield and M. L. H. Thomas, "Postglacial Changes in Distribution of Littoral Marine Invertebrates in the Canadian Atlantic Region", in *Proceedings of the Nova Scotia Institute of Science*, Vol. 27, Supp. 3, 1975, pp. 47, 51, 59.

² *Ibid.*, p. 48.

³ *Ibid.*, p. 48 and Figure 52.

⁴ *Ibid.*, p. 48.

⁵ D. R. Franz and A. S. Merrill, "The Origins and Determinants of Distribution of Molluscan Faunal Groups on the Shallow Continental Shelf of the Northwest Atlantic", in *Malacologia*, 1980, Vol. 19, No. 2, pp. 227, 229.

⁶ Figure 53. Franz and Merrill, *op. cit.*, p. 229.

⁷ D. R. Franz, E. K. Worley, and A. S. Merrill, "Distribution Patterns of Common Seastars of the Middle Atlantic Continental Shelf of the Northwest Atlantic (Gulf of Maine to Cape Hatteras)", in *Biological Bulletin*, Vol. 160, 1983, pp. 394-418.

configurations of the continental shelf, are barriers to the distribution of some faunal groups. . . . The major faunal barriers observed in this study are thermal, associated with the compression of bottom isotherms along the margins of Georges Bank and Nantucket Shoals. . . . (as noted also for ostracods by Hazel, 1970, polychaetes by Kinner, 1977, and amphipods by Watling, 1979)¹."

111. The more mobile benthic organisms, such as the pandalid shrimps, e.g., *Pandalus propinquus*, *Pandalus borealis* and *Pandalus montagui*, are essentially confined to the Gulf of Maine Basin, as are some species of arrow worms, e.g., *Sagitta lyra*, *Sagitta maxima*, *Sagitta serrodentata* and *Eukronia hamata*. On the other side of the faunal boundary, on Georges Bank and to the southwest, other species are found that seldom, if ever, wander into the Gulf of Maine Basin or onto the Scotian Shelf. Some examples are the crab *Cancer irroratus*, the mollusc *Spisula solidissima*, and such small crustacea as *Unciola irrorata*, *Mysidopsis bigelowi*, *Neomysis americanus*, and *Erythrops erythrophthalmus*².

112. Biogeographers often focus on bottom-dwelling (benthic) organisms in analyzing the biogeography of an area, because benthos are less mobile and have clearer patterns of distribution than do fish. Nevertheless, as previously noted, fish also respond to the biogeography of an area. For example, members of the fourspot flounder-butterfish association rarely penetrate north beyond the southern limit of the boreal zoogeographic province shown in Figure 52.

113. In summary, biogeographers group species of flora and fauna by shared geographic ranges. These biogeographers confirm that, in the Gulf of Maine area, there is a major faunal boundary, reflected in the distribution of zooplankton, benthos, fish, and shellfish. This boundary extends northeastward from Cape Cod along the northern edge of Georges Bank and through the Northeast Channel. The boundary is associated approximately with the 200-meter-depth contour between Georges Bank and the Gulf of Maine Basin and between Georges Bank and the Scotian Shelf. It is also associated with the thermal discontinuities that accompany the change in topography and the movement of water currents along the edge of Georges Bank.

¹ Franz, Worley, and Merrill, *op. cit.*, p. 416.

² Bigelow, *Plakton*, *op. cit.*; N.E.F.C. benthic data base.

CHAPTER III

THE NORTHEAST CHANNEL AND ITS SIGNIFICANCE

114. It long has been recognized that the Northeast Channel is a powerful factor in the shaping of the ocean climate and distribution of organisms in the Gulf of Maine area. In his classic work of 1926 on the plankton¹ of the Gulf of Maine area, Bigelow drew attention to the significance of the Northeast Channel, especially as a pathway into the Gulf of Maine Basin, at all levels of the water column, for organisms from the continental slope. See Figure 54².

115. The significance of the Northeast Channel can best be understood by considering how dramatically different the environment of the Gulf of Maine area would be if the Northeast Channel did not exist.

SECTION 1. The Physical Oceanography of the Gulf of Maine Area Would Be Radically Altered if the Northeast Channel Did Not Exist

116. If Georges Bank and the Scotian Shelf were joined, the area through which water could pass directly between the open ocean and the Gulf of Maine Basin would be reduced drastically. Figure 55³ shows the total area through which water now passes between Cape Cod and Cape Sable. If the Northeast Channel did not exist, the area through which water could pass would be reduced by approximately 25 per cent.

A. THE PHYSICAL OCEANOGRAPHY OF THE GULF OF MAINE BASIN WOULD BE RADICALLY DIFFERENT IF THE NORTHEAST CHANNEL DID NOT EXIST

117. The water that enters the Gulf of Maine Basin through the Northeast Channel at depths below 75 meters is of high salinity (34.7 to 35 parts per thousand) and relatively constant temperature (5 to 9 degrees Centigrade), and provides 60 to 70 per cent of the water in the Basin. If the Northeast Channel did not exist, this flow of deep slope water into the Basin would cease. Surface waters from the Atlantic Ocean and the

¹ Bigelow, *Plankton*, *op. cit.*

² Figure 54. *Ibid.*, p. 65.

³ Figure 55. Plot of the cross-sectional area above the bottom at its shallowest from Cape Cod to Cape Sable, Nova Scotia. The Northeast Channel represents about 25 per cent of the area through which water may pass between the Gulf of Maine Basin and the continental slope. Approximately 10 per cent of the cross-sectional area of the Northeast Channel is below that of any other area.

Scotian Shelf would become the principal source of water for the Gulf of Maine Basin, and the importance of precipitation and runoff as sources of water would increase. Over a period of time, the surface layers would become less saline. At the same time, any occasional inflow of more saline water would accumulate at the bottom of the Basin¹. As the differences between the densities of the top and bottom layers increased, the waters would be less well-mixed.

118. An examination of the conditions in the Baltic Sea, the Black Sea, and in certain Norwegian Fjords provides a view of the conditions that might exist if the Gulf of Maine Basin had no access to ocean water through the Northeast Channel². The bottom waters of these areas are not linked regularly to the open ocean. Consequently, the oxygen in the bottom layer is depleted, and the water becomes anaerobic and eventually toxic, or anoxic, through concentrations of hydrogen sulfide³.

119. Stratification of the water in the Gulf of Maine Basin in terms of its salinity would not be the only consequence of a loss of the water flowing into the Basin through the Northeast Channel. At present, the water temperatures in the Gulf of Maine Basin are moderated by the inflow of water of a relatively constant temperature through the Northeast Channel. If this inflow were to cease, the thermal moderation would also disappear. The surface waters of the Gulf of Maine Basin would be

¹ Under certain extreme weather conditions, saline ocean water would enter the Gulf of Maine Basin despite the barrier formed by Georges Bank and the Scotian Shelf. Because of its salinity and density, this water would sink to the bottom, with the result that the bottom waters would increase in salinity over time. Meanwhile, fresh water from rivers, other land runoff, and precipitation would make the surface waters relatively fresh. A simple description of such a system is contained in H.U. Sverdrup, M.W. Johnson and R. H. Fleming, *The Oceans—Their Physics, Chemistry, and General Biology*, 1946, pp. 148-149, and Figure 37B. At present, the saline water entering the Gulf of Maine Basin at depth through the Northeast Channel is mixed with the waters entering the Basin from the Scotian Shelf. If the Northeast Channel did not exist, this mechanism for mixing the bottom waters with the surface waters would be lost.

² Sverdrup, *op. cit.*, p. 150.

³ See T. Laevastu and I. Hela, *Fisheries Oceanography*, 1962, pp. 40-43. For both the Baltic and the Black Seas, there is more runoff and precipitation than there is evaporation, and the surface layers thereby are reduced in salinity. The deep basin (over 2,100 meters) of the Black Sea has water of even higher salinity that is stagnant, as does the Baltic Sea, even though its depths barely exceed 200 meters. The basins of the Gulf of Maine are deeper than those of the Baltic, reaching from 280 to nearly 400 meters in depth. Fish cannot live long in waters that are lacking in oxygen. They cannot survive in waters that are toxic from accumulations of hydrogen sulfide. Although their bottom waters are stirred in winter, some Norwegian fjords are essentially nonproductive year-round. This is because the stirring brings hydrogen sulfide to the surface in quantities sufficient to kill the animals living in the shallower waters.

colder in the winter and warmer in the summer. In winter, the surface waters in the Basin would be sufficiently cold and fresh to allow sea ice to form in the coastal regions. Furthermore, the strong front between the Gulf of Maine Basin and the southwestern tip of the Scotian Shelf, where the saline and relatively warm water from the Northeast Channel confronts the colder and fresher water of the Scotian Shelf, would disappear.

120. A diminution of nutrients in the Gulf of Maine Basin would be another consequence of the loss of the inflow through the Northeast Channel. At present, the water coming in through the Northeast Channel carries nitrates that are mixed into the water column, thus enriching the waters in the Gulf of Maine Basin. If the Northeast Channel did not exist, the Gulf of Maine Basin would not have this principal source of nutrients. Furthermore, because the water column in the Gulf of Maine Basin would not be stirred as thoroughly or as often, nutrients would accumulate at the bottom of the Basin, and would not enrich the upper levels of the water column.

121. If the Northeast Channel did not exist, the general pattern in which water circulates through the Gulf of Maine Basin would be altered as a result of the changes in temperature and salinity described above. Water would probably leave the Gulf of Maine Basin in much the same manner that the surface water presently moves off the Scotian Shelf towards the Atlantic Ocean. Both the present circulation pattern and the circulation pattern that likely would result if the Northeast Channel did not exist are illustrated in Figure 56¹. Figure 56 illustrates the principal consequences that would result if Georges Bank were joined to the Scotian Shelf. Water no longer would have access to the Basin through the Northeast Channel. Furthermore, while water presently does not flow into the Basin through the Great South Channel, some water might flow into the Basin through the Great South Channel if the Northeast Channel did not exist. A "two-tiered" system would be the result of this circulation pattern.

122. If the Northeast Channel did not exist, the force of the tides in the Gulf of Maine Basin would be reduced considerably. The water passing freely through the Northeast Channel greatly enhances the tides of the Gulf of Maine Basin and the Bay of Fundy, and contributes to the generation of currents and the mixing of water. If the Northeast Channel

¹ Figure 56. In Figure 56A, the present circulation pattern is illustrated. A "three-tier" system exists, maintained by the flow through the Northeast Channel. Water is stirred to a depth of 100 or more meters in the winter, keeping the surface relatively saline. The amount of flow inward through the Channel is balanced by the flow outward.

did not exist, the cross-sectional area through which water can pass would be reduced by approximately 25 per cent, and the tidal energy in the Gulf of Maine Basin and in the Bay of Fundy would be reduced by approximately the same percentage. *See* Figure 55, discussed in paragraph 116, *supra*.

B. THE PHYSICAL OCEANOGRAPHY OF GEORGES BANK AND THE SOUTHERN NEW ENGLAND SHELF WOULD BE RADICALLY DIFFERENT IF THE NORTHEAST CHANNEL DID NOT EXIST

123. If the Northeast Channel did not exist, nutrient-rich water from the intermediate layer in the Gulf of Maine Basin no longer would upwell onto Georges Bank¹. Water over Georges Bank would come from the Scotian Shelf and from the surface layer of the Gulf of Maine Basin. This water would be colder, less saline, and less rich in nutrients than is the water over Georges Bank at present. The gyre over Georges Bank would be considerably weakened. Georges Bank would be part of a "flow-through" system, with water from the Scotian Shelf crossing over Georges Bank and beyond to the southwest. The strong front between Georges Bank and the Gulf of Maine Basin resulting from the juxtaposition of contrasting oceanographic regimes would disappear. The sharp contrasts in temperature and salinity that form a barrier between the water that flows into the Gulf of Maine Basin through the Northeast Channel and the water that flows out of the Basin around the tip of Georges Bank also would disappear. The sharp differences between the physical oceanography of Georges Bank and that of the Scotian Shelf similarly would disappear. Because of the reduction in tidal energy and the changes in circulation, the pattern of bottom deposition and erosion would be altered. For example, the underwater sandwave features of Nantucket Shoals and Georges Bank would be diminished and shifted.

124. The effects of the loss of the Northeast Channel would be felt southwest of Georges Bank, along the southern New England shelf and beyond. Surface water carrying nutrients and other organic matter currently leaves the Gulf of Maine Basin round the tip of Georges Bank, and doubles back along the southern New England continental shelf. Similarly, some water over Georges Bank breaks out of the gyre and carries nutrients down the southern New England shelf. If the Northeast Channel did not exist, waters from the Gulf of Maine Basin and Georges Bank still would reach the southern New England continental shelf, but they would be less rich in nutrients.

¹ "The nitrogen flux into the Gulf of Maine through the Northeast Channel, conservatively estimated, is . . . roughly 40 percent of the amount needed to support production on Georges Bank." Ramp, *et al.*, *op. cit.*, p. 5. If this flow did not exist, both the Gulf of Maine Basin and Georges Bank would be less rich in nutrients.

125. In summary, if the Northeast Channel did not exist, the consequences for the physical oceanography of the Gulf of Maine area would include the following:

a. for the Gulf of Maine Basin:

1) a loss of the direct connection between the deep waters of the Gulf of Maine Basin and those of the continental slope, with the resulting loss of the continuous replacement of the bottom water in the Basin;

2) a change in the origins of the Basin's water;

3) a change in the temperature, salinity, and degree of stratification of the water in the Basin;

4) a loss of oxygen replenishment and thus of the capacity of the bottom waters of the Basin to support life;

5) a loss to the Basin of its principal source of nutrients;

6) a change in the circulation pattern in the Basin; and

7) a significant reduction in the tidal movement in the Basin;

b. for Georges Bank and the southern New England shelf:

1) a change in the origins and composition of the water over Georges Bank;

2) a loss of nutrients over Georges Bank;

3) a weakening of the gyre on Georges Bank, to the extent that the Bank would become part of a "flow-through" system;

4) a reduction in the tidal movement over Georges Bank; and

5) a loss of the downstream flow of saline water that bears nutrients to the southern New England shelf and beyond.

SECTION 2. The Ecology of the Gulf of Maine Area Would Be Radically Altered if the Northeast Channel Did Not Exist

126. If the Northeast Channel did not exist, there would be dramatic and harmful consequences to the ecology of the area. As noted above, the principal source of nitrates to the Gulf of Maine Basin is the slope water that enters through the Northeast Channel. Were this primary source of nutrients to be reduced, plant production in the Basin similarly would be greatly reduced. Also as noted above, this loss of nutrients would affect Georges Bank and the southern New England shelf and beyond. This loss would be reflected in a corresponding reduction in plant production in that region as well.

127. Plant production would be reduced further as a result of the diminution in tidal action. Tidal stirring enhances the recycling of nutrients by mixing the water column from the surface to the bottom. This occurs particularly around the periphery of the Gulf of Maine Basin and over Georges Bank and Nantucket Shoals. *See Figure 57*¹. If the Northeast Channel did not exist, there would be a decrease both in the area and in the extent of such vertical stirring, resulting in a further loss of phytoplankton productivity.

128. If the Northeast Channel did not exist, plant production would decrease. In turn, the productivity of herbivorous zooplankton would be affected adversely. As a result, the abundance of those fish and shellfish that feed on the herbivorous zooplankton would decrease.

129. The ecological effects of a loss of the Northeast Channel would not be restricted to the reduction in productivity stemming from the decrease in nutrients. As noted above, the pattern in which water circulates through the Gulf of Maine area also would be changed, as would water temperature and salinity. Similarly, the degree to which water mixed vertically would alter. At present, all of these factors lead to the existence, alongside one another, of the three separate and identifiable oceanographic and ecological regimes described in Chapters I and II of this Annex. If continental slope water no longer flowed into the Gulf of Maine Basin through the Northeast Channel, the waters of the Scotian Shelf, of the Gulf of Maine Basin, and of Georges Bank would cease to have the contrasting characteristics that led to the creation of these three separate regimes. As a result, the separate communities of flora and fauna that inhabit those respective regimes would cease to exist. Fish and shellfish species no longer would have the current variety of oceanographic regimes from which to choose, and, consequently, the diversity and abundance of fishery resources would decrease. The Northeast Channel is critical to the development of separate stocks over Georges Bank. The weakening of the Georges Bank gyre and the flow of water from the Scotian Shelf directly over Georges Bank that would result from a loss of the Northeast Channel would cause many of the separate Georges Bank stocks, such as cod, haddock, and silver hake, to disappear.

130. *Species of fish and shellfish would be affected in a number of respects by the loss of the Northeast Channel. Following the development of anaerobic and possibly anoxic conditions, the deep waters of the Gulf of*

¹ Figure 57. Figure 57A shows the current areas of mixing and enhanced primary production. The tidal actions combined with the topography of the Gulf of Maine Basin make this area unusually productive. In Figure 57B, the tidally mixed area, in which production would be sustained, has moved close to shore around the periphery of the Gulf of Maine Basin. In addition, it has moved seaward in the Georges Bank area.

Maine Basin no longer would serve as the primary habitat for members of the redfish-wolffish association. Thus, such species as redfish, argentine, witch flounder, cusk, wolffish, and thorny skate would cease to exist as significant resource populations in this area. Similarly, without the Northeast Channel, the sea herring-cod association, which includes pollock, haddock, and American plaice, no longer would appear in the deep waters of the Gulf of Maine Basin, albeit they would extend farther along the continental shelf to the southwest. Because the waters of the Gulf of Maine Basin and Georges Bank would be chilled as a consequence of the loss of the inflow through the Northeast Channel, members of the fourspot flounder-butterfish association, including the longfin squid, bluefish, northern sea robin, summer flounder, and spotted hake, no longer would appear in the area. The extent to which members of the silver hake-spiny dogfish association, which includes red hake, white hake, goosefish, and lobster, would be found in the Gulf of Maine Basin also would be substantially reduced. Overall, if the Northeast Channel did not exist, the fishery resources of the area would be greatly reduced, perhaps by as much as 50 per cent.

131. In summary, the biological consequences of a loss of the Northeast Channel would include the following:

- 1) a reduction of plant production as a result of the loss of important nutrients, particularly nitrates;
- 2) a reduction and shift of primary production because of the decrease and shift in tidal stirring;
- 3) a loss of the separate and identifiable communities of flora (phytoplankton) and fauna (zooplankton, benthos, fish, and shellfish) that exist at present in the three ecological regimes;
- 4) a loss of the separate fish stocks that inhabit the area;
- 5) a reduction in the diversity of species in the area; and
- 6) a marked reduction in the populations of valuable fishery resources.

132. In brief, a consideration of the transformation that the marine environment of the Gulf of Maine area would undergo if the Northeast Channel did not exist confirms the critical significance of the Northeast Channel. Without its influence, the three separate and identifiable oceanographic regimes that exist at present would disappear, together with the varied and abundant marine flora and fauna that inhabit the area.

CONCLUSION

133. Three oceanographic regimes exist alongside one another in the Gulf of Maine area. These regimes are distinct from one another in terms of their topography and of the circulatory pattern and physical characteristics of the water column. These differences, in turn, are reflected in the separate and identifiable biological communities that have developed within each of the oceanographic regimes. Thus, phytoplankton, zooplankton, and fish species, as well as separate fish stocks, are distributed in the area according to the water dynamics and other physical characteristics of the oceanographic regimes. As a consequence, the ecology of the Gulf of Maine area is divided into three separate and identifiable regimes.

134. Strong fronts exist where these respective regimes confront one another. Such a front occurs between the Gulf of Maine Basin regime and that of the Scotian Shelf, where water entering through the Northeast Channel mixes with water entering from the Scotian Shelf. Another front occurs between the Gulf of Maine Basin regime and the Georges Bank regime, where waters of different temperature and salinity abut each other.

135. The Northeast Channel largely is responsible for the existence of these three separate and identifiable ecological regimes. It is the influx of water from the continental slope, through the Northeast Channel and into the Gulf of Maine Basin, that is generally responsible for the development of these regimes. The effects of this influx are felt well beyond Georges Bank along the southern New England shelf. If the Northeast Channel did not exist, a single regime, lacking the richness of the present marine environment, would extend from the Scotian Shelf, through the Gulf of Maine Basin, over Georges Bank, and beyond.

Appendix A to Annex 1**COD**

Separate cod stocks in Subareas 4 (off Nova Scotia) and 5 (off New England) were recognized explicitly or implicitly in the following management actions taken by ICNAF¹:

- 1) Regulation of the cod and haddock trawl fisheries in Subareas 3, 4, and 5: for Subarea 5 the regulations substitute for the ones adopted in 1952 and 1953 (4-1/2 inch mesh size for Subareas 4 and 5; 4 inch mesh size for Subarea 3; 5,000 pound or 10 per cent trip exemption; savings gear) proposed 1955 (Ann. Proc. Vol. 5, p. 11-12).
- 2) Amendments to regulation of the cod and haddock trawl fisheries in Subareas 3, 4 and 5 adopted in 1955 (abeyance to para. IV for Subareas 3 and 4; 5,000 pound or 10 per cent 12-month exemption in Subarea 5 proposed in 1956 (Ann. Proc. Vol. 6, p. 16).
- 3) Amendments to regulations of the cod and haddock trawl fisheries in Subareas 3, 4 and 5 adopted in 1955 and 1956 (attaching savings gear) proposed in 1957 (Ann. Proc. Vol. 7, p. 17).
- 4) Regulations of cod, haddock and flounder trawl fisheries in Subarea 4; substitutes for 1955, 1956 and 1957 proposals (4-1/2 inch mesh size; mesh measurements; 5,000 pound or 10 per cent trip exemption; savings gear) proposed in 1961 (Ann. Proc. Vol. 11, p. 17-18).
- 5) Amendment to regulation of cod, haddock and flounder trawl fisheries in Subarea 4 adopted in 1961 (savings gear) proposed in 1963 (Ann. Proc. Vol. 13, p. 16).
- 6) Amendments to regulation of cod and haddock trawl fisheries in Subarea 5 adopted in 1955 (savings gear) proposed in 1963 (Ann. Proc. Vol. 13, p. 16-17).

¹ For a more detailed discussion of the management activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries, see Annex 3, Vol. II.

- 7) Amendment to a regulation for cod, haddock and flounder in trawl fisheries in Subarea 4 adopted in 1961 (Manila twine and ICNAF gauge as standard) proposed in 1964 (Ann. Proc. Vol. 14, p. 16-17).
- 8) Amendment to regulation of the cod and haddock trawl fisheries in Subarea 5 adopted in 1955 (Manila twine and ICNAF gauge as standard) proposed in 1964 (Ann. Proc. Vol. 14, p. 17).
- 9) Amendment to regulation for cod, haddock and flounder in Subarea 4 adopted in 1961 (extends exemption) proposed in 1965 (Ann. Proc. Vol. 15, p. 19).
- 10) Amendment to regulation for cod and haddock in Subareas 3 and 4 adopted in 1955 (extends exemption) proposed in 1965 (Ann. Proc. Vol. 15, p. 19).
- 11) Codification of regulations in Subareas 1, 2, 3, and 4 proposed in 1961, with amendments adopted in 1963, 1964, and 1965 (proposed in 1965) (Ann. Proc. Vol. 15, p. 19-24).
- 12) Amendments to trawl regulations adopted for Subarea 4 in 1955, 1961, 1964 and 1965; and in Subarea 5 in 1964 (5 kg. pressure or pull; measure 20 consecutive meshes of codend) proposed in 1967 (Ann. Proc. Vol. 17, p. 20).
- 13) Closed season and closed area regulations pertaining to haddock spawning areas on Georges Bank: prohibition of fishing with gear capable of catching *demersal* species [i.e., cod and haddock] during March and April 1970, 1971, 1972 for two portions of Georges Bank. (Ann. Proc. 19: 27-28).
- 14) Regulation of cod, haddock and yellowtail flounder trawl fisheries in Subarea 5: substitutes for regulation adopted in 1955, 1956, 1957, 1963, 1964, and 1967 (adds yellowtail flounder) proposed in 1970 (Ann. Proc. Vol. 20, p. 27).
- 15) Amendment to regulation adopted for Subarea 4 in 1965 (deletes alternative gauges) proposed in 1971 (Ann. Proc. Vol. 21, p. 31).
- 16) Regulation of cod fishery in Subdiv. 4Vs and Div. 4W of Subarea 4 (60,500-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 48).
- 17) Regulation of cod fishery in Div. 5Y of Subarea 5 (10,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 49).
- 18) Regulation of cod fishery in Subdiv. 5Ze and 5Zw of Subarea 5 (35,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 50).

- 19) Amendment to regulation of the cod, haddock and flounder trawl fisheries in Subarea 4 [114-mm (4-1/2 inches) mesh size in netting other than codend; 130-mm (5-1/8 inches) mesh size in codend] proposed in 1972 (Ann. Proc. Vol. 22, p. 64).
- 20) Amendment to regulation of cod, haddock and yellowtail flounder in Subarea 5 [114-mm (4-1/2 inches) mesh size in netting other than codend; 130-mm (5-1/8 inches) mesh size in codend] proposed in 1972 (Ann. Proc. Vol. 22, p. 65).
- 21) Further regulation of the cod fishery in Subdiv. 4Vs and Div. 4W of Subarea 4 (60,000-ton quota for 1974; national allocation proposed in 1973 (Ann. Rept. Vol. 23, p. 77).
- 22) (Div. 5Y and Div. 5Z cod stocks included in:) Regulation of fisheries in Subarea 5 and Statistical Area 6 (overall TAC 923,000 tons and allocations for 1974; commitment 850,000 tons and allocation for 1975 and commitment for 1976; species TACs and allocations; reporting procedures) proposed in 1973 (Ann. Rept. Vol. 24, pp. 27-29).
- 23) [Div. 4T (Jan.-Dec.) – Subdiv. 4Vn (Jan.-Apr.) and Subdiv. 4Vn (May-Dec.) cod stocks included in:] Regulation of fisheries in Subareas 2, 3, and 4 (TACs and allocations for 12 stocks for 1974; reporting procedures) proposed in 1974 (Ann. Rept. Vol. 24, p. 54).
- 24) Amendment to regulation for cod, haddock, and flounders in Subarea 4, adopted in 1965 (details exemptions) proposed in 1974 (Ann. Rept. Vol. 24, p. 93).
- 25) Amendment to regulation for cod, haddock, and yellowtail flounder trawl fisheries in Subarea 5 (details exemptions) proposed in 1974 (Ann. Rept. Vol. 24, p. 94).
- 26) Div. 4T (Jan.-Dec.) – Subdiv. 4Vn (Jan.-Apr.), Subdiv. 4Vn (May-Dec.), Div. 4VsW, Div. 4X (offshore), Div. 5Y, Div. 5Z cod stocks. Regulation of fisheries in the Convention Area and Statistical Area 6 (TAC and allocations for 54 stocks in the Convention Area and overall TAC and allocation of whole group of stocks in Subarea 5 and Statistical Area 6 for 1975) proposed in 1974 (Ann. Rept. Vol. 24, pp. 101-104).
- 27) Regulation of cod and haddock fisheries in Div. 4X of Subarea 4 (determines exemption at 5,510 lb. or 2,500 kg or 1 per cent by weight; closed season, March, April and May and closed area to exclude LaHave Bank) proposed in 1975 (Ann. Rept. Vol. 25, p. 87).

- 28) Subdiv. 4Vn (May-Dec.), Div. 5Y, and Div. 5Z cod stocks. Regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TACs and allocations for 49 stocks (first tier); TACs and allocations for whole group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 25, pp. 94-96).
- 29) Amendment to regulation for cod, haddock and flounder trawl fisheries in Subarea 4 (exemption of 2,000 kg. (5,510 lb.) or 10 per cent by weight) proposed in 1975 (Ann. Rept. Vol. 26, p. 40).
- 30) Amendment to regulation for cod, haddock and yellowtail flounder trawl fisheries in Subarea 5 (exemption of 2,500 kg. (5,510 lb.) or 10 per cent by weight) proposed in 1975 (Ann. Rept. Vol. 26, p. 41).
- 31) Div. 4T (Jan.-Dec.) – Subdiv. 4Vn (Jan.-Apr.), Div. 4VsW, Div. 4X (offshore), and Div. 5Z cod stocks. Amendment to regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TAC and allocations for 9 stocks deferred from 1975 Annual Meeting and revised allocations for 19 stocks agreed at 1975 Annual Meeting; revised allocation for the group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 26, pp. 42-43).
- 32) Subdiv. 4Vn (May-Dec.), Div. 4VsW, Div. 4X (offshore), Div. 5Y, and Div. 5Z cod stocks. Regulation of fisheries by catch quota in the Convention Area and Statistical Areas 0 and 6 [for 1977; TACs and national allocations for 51 stocks (first tier)] proposed in 1976 (Ann. Rept. Vol. 26, pp. 115-118).

After extending its fisheries jurisdiction to 200 nautical miles, Canada recognized explicitly or implicitly the separateness of cod stocks in Subareas 4 and 5 in the following actions:

- 1) TACs for 4T-4Vn (Jan.-Apr.), 4Vn (May-Dec), 4VsW, and 4X (offshore) stocks for 1978 (CAFSAC Ann. Rept. Vol. 1, p. 23).
- 2) TACs for 4T-4Vn (Jan.-Apr.), 4Vn (May-Dec), 4VsW, and 4X (offshore) stocks for 1979 (CAFSAC Ann. Rept. Vol. 1, p. 23).
- 3) TACs for 4Vn (Jan.-Apr.)-4T, 4Vn (May-Dec), 4VsW, and 4X (offshore) stocks for 1980 (CAFSAC Ann. Rept. Vol. 2, p. 21).
- 4) TACs for 4Vn (Jan.-Apr.)-4T, 4Vn (May-Dec), 4VsW, and 4X (offshore) stocks for 1981 (CAFSAC Ann. Rept. Vol. 3, p. 10).
- 5) TACs for 4Vn (Jan.-Apr.)-4T, 4Vn (May-Dec), 4VsW, and 4X (offshore) stocks for 1982 (CAFSAC Ann. Rept. Vol. 4, p. 11).

- 6) TACs for 4Vn (Jan.-Apr.)-4T, 4Vn (May-Dec), 4VsW, and 4X (offshore) stocks for 1983 (CAFSAC Adv. Doc. 82/13).
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Appendix B to Annex 1

HERRING

Separate herring stocks in Subareas 4 (off Nova Scotia) and 5 (off New England) were recognized explicitly or implicitly in the following actions taken by ICNAF¹:

- 1) Regulation of herring fishery on Georges Bank stock (150,000-ton quota for 1972, national allocations, logbook, action for 1973, mutual allocation) proposed in 1972 (Ann. Proc. Vol. 22, p. 70).
- 2) Regulation of herring fishery in Div. 5Y of Subarea 5 (30,000-ton quota for 1972, national allocations, logbook, action for 1973, mutual allocation) proposed in 1972 (Ann. Proc. Vol. 22, p. 71).
- 3) Regulation of herring fishery in Div. 4X and part of Div. 4W of Subarea 4 (65,000-ton quota for 1972, national allocations, logbook, action for 1973, mutual allocation) proposed in 1972 (Ann. Proc. Vol. 22, p. 72).
- 4) Regulation of herring fishery in Subareas 4 and 5 (9-inch size limit excluding the area north of 44 degrees 52' N lat in Div. 4W of Subarea 4 and the area north of 43 degrees 50' N lat in Div. 4X of Subarea 4, 10 per cent weight exemption) proposed in 1972 (Ann. Proc. Vol. 22, pp. 73-74).
- 5) Further regulation of the herring fishery from Georges Bank stock (150,000-ton quota for 1973, national allocation, commitment for 1974 catch level) proposed in 1973 (Ann. Rept. Vol. 23, pp. 28-29).
- 6) Further regulation of the herring fishery in Div. 5Y of Subarea 5 (25,000-ton quota for 1973, national allocation, commitment for 1974 catch level) proposed in 1973 (Ann. Rept. Vol. 23, p. 30).
- 7) Further regulation of the herring fishery in Div. 4X and part of Div. 4W of Subarea 4 (90,000-ton quota for 1973, national allocation) proposed in 1973 (Ann. Rept. Vol. 23, p. 31).
- 8) Regulation of the herring fishery in Div. 4V and northern part of Div. 4W of Subarea 4 (45,000-ton quota for 1974; national allocation) proposed in 1973 (Ann. Rept. Vol. 23, p. 80).

¹ For a more detailed discussion of the management activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries, see Annex 3, Vol. II.

- 9) Further regulation of the herring fishery in Div. 4X and southern part of Div. 4W of Subarea 4 (commitment to set TAC and allocate for 1974 at January 1974 Commission Meeting) proposed in 1973 (Ann. Rept. Vol. 23, p. 81).
- 10) Further regulation of the herring fishery from the Georges Bank stock (commitment for TAC and allocation for 1974 at January 1974 Commission Meeting) proposed in 1973 (Ann. Rept. Vol. 23, p. 87).
- 11) Further regulation of the herring fishery in Div. 5Y of Subarea 5 (commitment for TAC and allocation for 1974 at January 1974 Commission Meeting) proposed in 1973 (Ann. Rept. Vol. 23, p. 88).
- 12) Amendment to size limit regulation for herring in Subareas 4 and 5 (adds exemption of 25 per cent by count) proposed in 1974 (Ann. Rept. Vol. 24, p. 52).
- 13) Amendment to size-limit regulation for herring in Subareas 4 and 5 (details exemption procedure) proposed in 1974 (Ann. Rept. Vol. 24, p. 98).
- 14) Three herring stocks in Subarea 4 Div. 5Y stock, and Div. 5Z and SA6 stock. Regulation of fisheries in the Convention Area and Statistical Area 6 (TAC and allocations for 54 stocks in the Convention Area and overall TAC and allocation of whole group of stocks in Subarea 5 and Statistical Area 6 for 1975) proposed in 1974 (Ann. Rept. Vol. 24, pp. 101-104).
- 15) Amendment to regulation of herring fishery in Div. 5Y of Subarea 5 (amends TAC and allocations for 1975 set by Proposal (13) at June 1974 Meeting) proposed in 1974 (Ann. Rept. Vol. 25, p. 32).
- 16) Regulation of herring fishery in Div. 4VWX of Subarea 4 (commitment to revise TAC and allocation for 1976 at Special January 1976 Meeting; procedures for effecting TAC and allocation for 1976 before normal six-month procedure) proposed in 1975 (Ann. Rept. Vol. 25, p. 88).
- 17) Regulation of herring fishery in Div. 5Z of Subarea 5 and Statistical Area 6 (commitment to set TAC and allocation for 1976 at Special January 1976 Meeting; procedures for effecting TAC and allocation for 1976 before normal six-month procedure) proposed in 1975 (Ann. Rept. Vol. 25, p. 89).
- 18) Regulation of herring fishery in Div. 5Y of Subarea 5 (commitment to set TAC and allocation for 1976 at Special January 1976 Meeting; procedures for effecting TAC and allocation for

1976 before normal six-month procedure) proposed in 1975 (Ann. Rept. Vol. 25, p. 90).

- 19) Div. 4VW(a) and Div. 4XW(b) stocks of herring. Regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TACs and allocations for 49 stocks (first tier); TACs and allocations for whole group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 25, pp. 94-96).
- 20) Regulation of herring fisheries by catch quota in Div. 5Z of Subarea 5 and in Statistical Area 6 (for 1976; TAC and allocation for 1 January-30 June 1976; TAC for 1 January-31 December 1976; restricted in 1 January-30 June to purse seines or vessels less than 110 feet (33.5m.); exemption 7.5 per cent after 72 hours fishing; commitment to set TAC and allocation for 1 July-31 December 1976 and bring into force 1 July 1976; commitment to adult stock levels and TACs for future years) proposed in 1976 (Ann. Rept. Vol. 26, p. 67).
- 21) Regulation of herring fisheries by catch quota in Div. 5Y of Subarea 5 (for 1976; set TAC and allocation but allows adjustment at June 1976 Annual Meeting which becomes effective when notified of amounts by Depository Government) proposed in 1976 (Ann. Rept. Vol. 26, p. 68).
- 22) Regulation of herring fisheries by catch quota in Div. 4VWX of Subarea 4 (commitment to set TAC and allocations at June 1976 Annual Meeting and to become effective when notified of amounts by Depository Government) proposed in 1976 (Ann. Rept. Vol. 26, p. 69).
- 23) Amendments to size limit for herring in Subareas 4 and 5 (size limit 9 inches (22.7 cm) in Div. 4Wb and 4Xa; exemption of 10 per cent by weight or 25 per cent by count after 48 hours fishing) proposed in 1976 (Ann. Rept. Vol. 26, p. 70).
- 24) Amendment to regulation of fisheries by catch quota in Subareas 2, 3, 4, and 5, and Statistical Area 6 (national reallocations for 1976 of herring in Div. 4XW(b), and Div. 5Z and Statistical Area 6) proposed in 1976 (Ann. Rept. Vol. 26, p. 114).
- 25) Herring in Div. 4VW(a) and Div. 5Y. Regulation of fisheries by catch quota in the Convention Area and Statistical Areas 0 and 6 [for 1977]; TACs and national allocations for 51 stocks [first tier] proposed in 1976 (Ann. Rept. Vol. 26, pp. 115-118).
- 26) Regulation of the herring fishery in Div. 5Z of Subarea 5 and Statistical Area 6 (for 1977; TAC and allocations; herring "window" area, 15 August-30 September for pelagic gear only;

exemption 5 per cent for incidental non-allocated herring and 1 per cent for incidental non-allocated other species) proposed in 1976 (Ann. Rept. Vol. 27, p. 37-38).

- 27) Herring in 4XW(b) and 5Z and 6. Regulation of the fisheries by catch quota in the Convention Area and Statistical Area 6 (for 1977; TACs and allocations for nine stocks (first-tier) deferred from 1976 Annual Meeting (proposed 8) and TAC and allocation for group of stocks (collectively) (second-tier) in Subarea 5 and Statistical Area 6) proposed in 1976 (Ann. Rept. Vol. 27, p. 45).

After extending its fisheries jurisdiction to 200 nautical miles, Canada recognized explicitly or implicitly the separateness of herring stocks in Subareas 4 and 5 in the following actions:

- 1) TACs for 4W(a) and 4XW(b) stocks for 1978 and 1979 and for 4V stock for July 1977-June 1978 and for July 1978-June 1979 (CAFSAC Ann. Rept. Vol. 1, pp. 37-38).
 - 2) TACs for 4V stock for July 1979-June 1980 and for 4W(a) and 4XW(b) stocks for 1979 (CAFSAC Ann. Rept. Vol. 2, p. 33).
 - 3) TACs for 4W(a) and 4XW(b) stocks for 1980 and for 4V stock for July 1980-June 1981 (CAFSAC Ann. Rept. Vol. 3, p. 12).
 - 4) TACs for 4W(a) and 4XW(b) stocks for 1981 and for 4V stock for July 1981-June 1982 (CAFSAC Ann. Rept. Vol. 4, p. 13).
 - 5) TACs for 4W(a) and 4XW(b) stocks for 1982 (CAFSAC Adv. Doc. 82/10).
 - 6) TACs for 4V stock for July 1982-June 1983 (CAFSAC Adv. Doc. 82/16).
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Appendix C to Annex 1**HADDOCK**

Separate haddock stocks in Subareas 4 (off Nova Scotia) and 5 (off New England) were recognized explicitly or implicitly in the following actions taken by ICNAF¹.

- 1) Regulation of the haddock trawl fishery in Subarea 5 (4-1/2 inch mesh size, wet; 5,000 pound or 10 per cent trip exemption; savings gear) proposed 1952 (Ann. Proc. Vol. 2, p. 14).
- 2) *Amendments to regulation of the haddock trawl fishery in Subarea 5 (wet and dry mesh measurements) proposed 1953* (Ann. Proc. Vol. 3, p. 14).
- 3) Regulation of the cod and haddock trawl fisheries in Subarea 3, 4 and 5: for Subarea 5 the regulations substitute for the ones adopted in 1952 and 1953 (4-1/2 inch mesh size for Subareas 4 and 5; 4 inch mesh size for Subarea 3; 5,000 pound or 10 per cent trip exemption; savings gear) proposed 1955 (Ann. Proc. Vol. 5, pp. 11-12).
- 4) *Amendments to regulation of the cod and haddock trawl fisheries in Subareas 3, 4, and 5 adopted in 1955 (abeyance to para. IV for Subareas 3 and 4; 5,000 pound or 10 per cent 12-month exemption in Subarea 5 proposed in 1956* (Ann. Proc. Vol. 6, p. 16).
- 5) *Amendments to regulations of the cod and haddock trawl fisheries in Subareas 3, 4, and 5 adopted in 1955 and 1956 (attaching savings gear) proposed in 1957* (Ann. Proc. Vol. 7, p. 17).
- 6) *Regulations of cod, haddock and flounder trawl fisheries in Subarea 4; substitutes for 1955, 1956 and 1957 proposals (4-1/2 inch mesh size; mesh measurements; 5,000 pound or 10 per cent trip exemption; savings gear) proposed in 1961* (Ann. Proc. Vol. 11, p. 17-18).

¹ For a more detailed discussion of the management activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries, see Annex 3, Vol. II.

- 7) Amendment to regulation of cod, haddock and flounder trawl fisheries in Subarea 4 adopted in 1961 (savings gear) proposed in 1963 (Ann. Proc. Vol. 13, p. 16).
- 8) Amendments to regulation of cod and haddock trawl fisheries in Subarea 5 adopted in 1955 (savings gear) proposed in 1963 (Ann. Proc. Vol. 13, p. 16-17).
- 9) Amendment to a regulation of the cod, haddock and flounder trawl fisheries in Subarea 4 adopted in 1961 (Manila twine and ICNAF gauge as standard) proposed in 1964 (Ann. Proc. Vol. 14, pp. 16-17).
- 10) Amendment to regulation of the cod and haddock trawl fisheries in Subarea 5 adopted in 1955 (Manila twine and ICNAF gauge as standard) proposed in 1964 (Ann. Proc. Vol. 14, p. 17).
- 11) Amendment to regulation for cod, haddock, and flounder in Subarea 4 adopted in 1961 (extends exemption) proposed in 1965 (Ann. Proc. Vol. 15, p. 19).
- 12) Amendment to regulation for cod and haddock in Subareas 3 and 4 adopted in 1955 (extends exemption) proposed in 1965 (Ann. Proc. Vol. 15, p. 19).
- 13) Codification of regulations in Subarea 1, 2, 3, and 4 proposed in 1961, with amendments adopted in 1963, 1964, and 1965 (proposed in 1965) (Ann. Proc. Vol. 15, pp. 19-24).
- 14) Amendments to trawl regulations adopted for Subarea 4 in 1955, 1961, 1964, and 1965; and in Subarea 5 in 1964 (5 kg. pressure or pull; measure 20 consecutive meshes of codend) proposed in 1967 (Ann. Proc. Vol. 17, p. 20).
- 15) Regulation of haddock fishery in Subarea 5 (for 1970, 1971, and 1972, catch quota 12,000 metric tons, closed season and area) proposed in 1969 (Ann. Proc. Vol. 19, p. 27).
- 16) Regulation of haddock fishery in Div. 4X of Subarea 4 (for 1970, 1971, and 1972, catch quota of 18,000 metric tons, closed season and area) proposed in 1969 (Ann. Proc. Vol. 19).
- 17) Regulation of cod, haddock, and yellowtail flounder trawl fisheries in Subarea 5; substitutes for regulation adopted in 1955, 1956, 1957, 1963, 1964, and 1967 (adds yellowtail flounder) proposed in 1970 (Ann. Proc. Vol. 20, p. 27).
- 18) Amendment to regulation adopted for Subarea 5 (deletes alternative gauges, 130-mm. mesh size for yellowtail flounder) proposed in 1971 (Ann. Proc. Vol. 21, pp. 30-31).

- 19) Further regulation of haddock fishery in Subarea 5 [review annually, catch quota of 6,000 tons, closed season (March, April, May) and area] proposed in 1971 (Ann. Proc. Vol. 21, pp. 32-33).
- 20) Further regulation of haddock fishery in Div. 4X of Subarea 4 [for 1972, catch quota of 9,000 tons, closed season (March, April, May) and new area] proposed in 1971 (Ann. Proc. Vol. 21, pp. 33-34).
- 21) Regulation of haddock fishery in Div. 4W of Subarea 4 (for 1972, catch quota of 4,000 tons) proposed in 1971 (Ann. Proc. Vol. 21, pp. 34-35).
- 22) Amendment to regulation adopted for Subarea 4 in 1965 (deletes alternative gauges) proposed in 1971 (Ann. Proc. Vol. 21, p. 31).
- 23) Amendment to haddock quota regulation in Subarea 5 (for 1973, new boundaries for westerly area for closure) proposed in 1972 (Ann. Proc. Vol. 22, p. 59).
- 24) Amendment to haddock quota regulation in Subarea 5 (6,000-ton quota for 1973) proposed in 1972 (Ann. Proc. Vol. 22, p. 60).
- 25) Amendments to haddock quota regulation in Div. 4X of Subarea 4 (9,000-ton quota for 1973, closed season and area for 1973) proposed in 1972 (Ann. Proc. Vol. 22, p. 61).
- 26) Amendment to haddock quota regulation in Div. 4W of Subarea 4 (4,000-ton quota for 1973) proposed in 1972 (Ann. Proc. Vol. 22, p. 62).
- 27) Amendment to regulation of the cod, haddock, and flounder trawl fisheries in Subareas 4 [114-mm. (4-1/2 inches) mesh size in netting other than codend; 130-mm. (5-1/8 inches) mesh size in codend] proposed in 1972 (Ann. Proc. Vol. 22, p. 64).
- 28) Amendment to regulation of cod, haddock, and yellowtail flounder in Subarea 5 [114-mm. (4-1/2 inches) mesh size in netting other than codend; 130-mm. (5-1/8 inches) mesh size in codend] proposed in 1972 (Ann. Proc. Vol. 22, p. 65).
- 29) Further regulation of the haddock fishery in Div. 4X of Subarea 4 (prohibits directed fishery; exemption; closed area and season for 1974) proposed in 1973 (Ann. Rept. Vol. 23, p. 78).
- 30) Further regulation of the haddock fishery in Div. 4V and 4W of Subarea 4 (prohibits directed fishery; exemption) proposed in 1973 (Ann. Rept. Vol. 23, p. 79).
- 31) Further regulation of the haddock fishery in Subarea 5 (prohibits directed fishery; exemption; closed area and season for 1974) proposed in 1973 (Ann. Rept. Vol. 23, p. 86).

- 32) Amendment to regulation for cod, haddock, and flounder in Subarea 4, adopted in 1965 (details exemptions) proposed in 1974 (Ann. Rept. Vol. 24, p. 93).
- 33) Amendment to regulation for cod, haddock, and yellowtail flounder trawl fisheries in Subarea 5 (details exemptions) proposed in 1974 (Ann. Rept. vol. 24, p. 94).
- 34) Regulation of haddock fishery in Div. 4X of Subarea 4 (closed area, March, April and May, restricted to pelagic gear) proposed in 1974 (Ann. Rept. Vol. 24, p. 95).
- 35) Regulation of haddock fishery in Subarea 5 (commitment to determine exemption at Special Meeting, restricted to pelagic gear March, April, and May in closed areas) proposed in 1974 (Ann. Rept. Vol. 24, p. 96).
- 36) Regulation of haddock fishery in Div. 4VW of Subarea 4 (commitment to determine exemption at Special Meeting) proposed in 1974 (Ann. Rept. Vol. 24, p. 97).
- 37) (Haddock in Div. 4VW, 4X, and Subarea 5 included in:) Regulation of fisheries in the Convention Area and Statistical Area 6 (TAC and allocations for 54 stocks in the Convention Area and overall TAC and allocation of whole group of stocks in Subarea 5 and Statistical Area 6 for 1975) proposed in 1974 (Ann. Rept. Vol. 24, pp. 101-104).
- 38) Amendment to regulation of haddock fishery in Div. 4X of Subarea 4 (extends closed season to February, March, April, and May, and closed area to include LaHave Bank) proposed in 1974 (Ann. Rept. Vol. 25, p. 33).
- 39) Amendment to regulation of haddock fishing in Div. 4VW of Subarea 4 (determines exemption at 5,000 lb. or 10 per cent by weight) proposed in 1974 (Ann. Rept. Vol. 25, p. 34).
- 40) Regulation of haddock fishery in Div. 4X of Subarea 4 (5,000 lb. or 10 per cent by weight exemption for countries not mentioned in 1975 quota allocations for haddock in Div. 4X as determined by Proposal (13) at June 1974 Meeting) proposed in 1974 (Ann. Rept. Vol. 25, p. 35).
- 41) Amendments to regulation of haddock fishery in Subarea 5 (TAC and allocations for 1975; exemption 5,510 or 1 per cent by weight; pelagic gear only in closed areas and season) proposed in 1974 (Ann. Rept. Vol. 25, p. 36).

- 42) Further amendment to regulation of haddock fishery in Div. 4VW of Subarea 4 (determines exemption at 5,510 lb. or 2,500 kg. or 1 per cent by weight for 1976) proposed in 1975 (Ann. Rept. Vol. 25, p. 86).
- 43) Regulation of cod and haddock fisheries in Div. 4X of Subarea 4 (determines exemption at 5,510 lb. or 2,500 kg. or 1 per cent by weight; closed season, March, April and, May and closed area to exclude La Have Bank) proposed in 1975 (Ann. Rept. Vol. 25, p. 87).
- 44) Amendment to regulation of haddock fishery in Subarea 5 (exemption for 1976 5,510 lb. or 2,500 kg. or 1 per cent; pelagic gear only in closed areas (a) and (b) and season) proposed in 1975 (Ann. Rept. Vol. 25, p. 91).
- 45) (Haddock in Div. 4W and Subarea 5 included in:) Regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TACs and allocations for 49 stocks (first tier); TACs and allocations for whole group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 25, pp. 94-96).
- 46) Amendment to regulation for cod, haddock, and flounder trawl fisheries in Subarea 4 (exemption of 2,000 kg. (5,510 lb.) or 10 per cent by weight) proposed in 1975 (Ann. Rept. Vol. 26, p. 40).
- 47) Amendment to regulation for cod, haddock, and yellowtail flounder trawl fisheries in Subarea 5 (exemption of 2,500 kg. (5,510 lb.) or 10 per cent by weight) proposed in 1975 (Ann. Rept. Vol. 26, p. 41).
- 48) (Haddock in Div. 4X included in:) Amendment to regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TAC and allocations for nine stocks deferred from 1975 Annual Meeting and revised allocations for 19 stocks agreed at 1975 Annual Meeting; revised allocation for the group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 26, p. 42-43).
- 49) Further amendment to regulation of haddock fishery in Div. 4VW of Subarea 4 (determines exemption for 1977) proposed in 1976 (Ann. Rept. Vol. 26, p. 110).
- 50) Further amendment to regulation of haddock fishery in Subarea 5 (change from 1976 exemption to annual exemption) proposed in 1976 (Ann. Rept. Vol. 26, p. 113).
- 51) (Haddock in Div. 4VW, Div. 4X, and Subarea 5 included in:) Regulation of fisheries by catch quota in the Convention Area

and Statistical Areas 0 and 6 [for 1977; TACs and national allocations for 51 stocks (first tier)] proposed in 1976 (Ann. Rept. Vol. 26, pp. 115-118).

After extending its fisheries jurisdiction to 200 nautical miles, Canada recognized explicitly or implicitly the separateness of the haddock stocks in Subareas 4 and 5 in the following actions:

- 1) TACs for 4VW, and 4X stocks for 1978 (CAFSAC Ann. Rept. Vol. 1, p. 23).
 - 2) TACs for 4VW, and 4X stocks for 1979 (CAFSAC Ann. Rept. Vol. 1, p. 23).
 - 3) TACs for 4VW, and 4X stocks for 1980 (CAFSAC Ann. Rept. Vol. 2, p. 21).
 - 4) TACs for 4VW, and 4X stocks for 1981 (CAFSAC Ann. Rept. Vol. 3, p. 10).
 - 5) TACs for 4VW, and 4X stocks for 1982 (CAFSAC Ann. Rept. Vol. 4, p. 11).
 - 6) TACs for 4VW, and 4X stocks for 1983 (CAFSAC Adv. Doc. 82/13).
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Appendix D to Annex 1**SILVER HAKE**

Separate stocks of silver hake in Subareas 4 (off Nova Scotia) and 5 (off New England) were recognized explicitly or implicitly in the following actions taken by ICNAF¹:

- 1) Regulation of silver hake fishery in Div. 5Y of Subarea 5 (10,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 55)
- 2) Regulation of silver hake fishery in Subdiv. 5Ze of Subarea 5 (80,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 56).
- 3) Regulation of silver hake fishery from Southern New England stock (Subdiv. 5Zw of Subarea 5 and adjacent waters to the west and south) (80,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 57).
- 4) Regulation of the silver hake fishery in Div. 4V, 4W, and 4X of Subarea 4 (100,000-ton quota for 1974; national allocation) proposed in 1973 (Ann. Rept. Vol. 23, p. 83).
- 5) Silver hake in 5Y, 5Ze, 5Zw, and 6. Regulation of fisheries in Subarea 5 and Statistical Area 6 (overall TAC 923,000 tons and allocations for 1974; commitment 850,000 tons and allocation for 1975 and commitment for 1976; and species TACs and allocations; reporting procedures) proposed in 1973 (Ann. Rept. Vol. 24, pp. 27-29).
- 6) Silver hake in 4VWX, 5Y, 5Ze, 5Zw, and 6. Regulation of fisheries in the Convention Area and Statistical Area 6 (TAC and allocations for 54 stocks in the Convention Area and overall TAC and allocation of whole group of stocks in Subarea 5 and Statistical Area 6 for 1975) proposed in 1974 (Ann. Rept. Vol. 24, pp. 101-104).
- 7) Silver hake in 4VWX, 5Y, 5Ze, 5Zw, and 6. Regulation of fisheries by catch quota in Convention Area and Statistical

¹ For a more detailed discussion of the management activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries, see Annex 3, Vol. II.

Areas 0 and 6 (for 1976; TACs and allocations for 49 stocks (first tier); TACs and allocations for whole group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 25, pp. 94-96).

- 8) Silver hake in 4VWX, 5Ze, 5Zw, and 6. Amendment to regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TAC and allocations for nine stocks deferred from 1975 Annual Meeting and revised allocations for 19 stocks agreed at 1975 Annual Meeting; revised allocation for the group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 26, pp. 42-43).
- 9) Regulation of silver hake in Subarea 4 (60mm. (manila) mesh size, exemption, codend covers) proposed in 1976 (Ann. Rept. Vol. 26, p. 109).
- 10) Silver hake in 5Y, 5Ze, 5Zw, and 6. Regulation of fisheries by catch quota in the Convention Area and Statistical Areas 0 and 6 [for 1977; TACs and national allocations for 51 stocks (first tier)] proposed in 1976 (Ann. Rept. Vol. 26, pp. 115-118).
- 11) Regulation of silver hake fisheries in Div. 5Z of Subarea 5 and Statistical Area 6 (restricts fisheries to "window" Area A, 1 January-31 March; Area B, 1 January-30 April; and Area C, 1 April-31 August; exemption clauses) proposed in 1976 (Ann. Rept. Vol. 27, p. 36.)
- 12) Silver hake in 4VWX. Regulation of the fisheries by catch quota in the Convention Area and Statistical Area 6 for 1977; TACs and allocations for nine stocks (first-tier) deferred from 1976 Annual Meeting (proposed eight) and TAC and allocation for group of stocks (collectively) (second-tier) in Subarea 5 and Statistical Area 6) proposed in 1976 (Ann. Rept. Vol. 27, p. 45).

After extending its fisheries jurisdiction to 200 nautical miles, Canada recognized explicitly or implicitly the separateness of silver hake stocks in subareas 4 and 5 in the following actions:

- 1) TAC for 4VWX silver hake stock for 1978 and 1979 (CAFSAC Ann. Rept. Vol. 1, p. 23).
 - 2) TAC for 4VWX silver hake stock for 1980 (CAFSAC Ann. Rept. Vol. 2, p. 21).
 - 3) TAC for 4VWX silver hake stock for 1981 (CAFSAC Ann. Rept. Vol. 3, p. 10).
 - 4) TAC for 4VWX silver hake 4 T white hake for 1982 (CAFSAC Ann. Rept. Vol. 4, p. 11).
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Appendix E to Annex 1**RED HAKE**

Separate stocks of red hake in Subareas 4 (off Nova Scotia) and 5 (off New England) were recognized explicitly or implicitly with the following actions taken by ICNAF¹:

- 1) Regulation of red hake fishery from Southern New England stock (Subdiv. 5Zw of Subarea 5 and adjacent waters to the west and south) (40,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 58).
- 2) Red hake in 5Z (West of 69 degrees) and 6. Regulation of fisheries in Subarea 5 and Statistical Area 6 (overall TAC 923,000 tons and allocations for 1974; commitment 850,000 tons and allocation for 1975 and commitment for 1976; species TACs and allocations; reporting procedures) proposed in 1973 (Ann. Rept. Vol. 24, pp. 27-29).
- 3) Regulation of red hake, argentine, and other finfish fisheries in Subarea 5 and Statistical Area 6 (species TACs and allocations for 1974 completing Table in Proposal (1) of October 1973 Commission Meeting) proposed in 1974 (Ann. Rept. Vol. 24, p. 53).
- 4) Red hake in 5Z (East of 69 degrees) and 5Z (West of 69 degrees) and 6. Regulation of fisheries in the Convention Area and Statistical Area 6 (TAC and allocations for 54 stocks in the Convention Area and overall TAC and allocation of whole group of stocks in Subarea 5 and Statistical Area 6 for 1975) proposed in 1974 (Ann. Rept. Vol. 24, pp. 101-104).
- 5) Red hake in 5Ze, 5Zw, and 6, and silverhake in 4VWX, 5Y, 5Ze, 5Zw, and 6. Regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TACs and allocations for 49 stocks (first tier); TACs and allocations for whole group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 25, pp. 94-96).

¹ For a more detailed discussion of the management activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries, see Annex 3, Vol. II.

- 6) Red hake in 5Ze, 5Zw, and 6. Amendment to regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TAC and allocations for nine stocks deferred from 1975 Annual Meeting and revised allocations for 19 stocks agreed at 1975 Annual Meeting; revised allocation for the group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 26, pp. 42-43).
 - 7) Red hake in 5Ze, 5Zw, and 6. Regulation of fisheries by catch quota in the Convention Area and Statistical Areas 0 and 6 [for 1977; TACs and national allocations for 51 stocks (first tier)] proposed in 1976 (Ann. Rept. Vol. 26, pp. 115-118).
 - 8) Regulation of red hake fisheries in Div. 5Z of Subarea 5 and Statistical Area 6 (restricts fisheries to "window" Area A, 1 January-31 March; Area B, 1 January-30 April; and Area C, 1 April-31 August; exemption clauses) proposed in 1976 (Ann. Rept. Vol. 27, p. 36).
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Appendix F to Annex 1**REDFISH**

Separate redfish stocks in Subareas 4 (off Nova Scotia) and 5 (off New England) were explicitly or implicitly recognized in the following actions taken by ICNAF¹:

- 1) Regulation of the fishery for redfish in Subarea 5 (30,000-ton quota for 1973; national allocation) proposed in 1973 (Ann. Rept. Vol. 23, p. 35).
- 2) Regulation of the redfish fishery in Div. 4V, 4W, and 4X of Subarea 4 (40,000-ton quota for 1974; national allocation) proposed in 1973 (Ann. Rept. Vol. 23, p. 82).
- 3) Redfish in Subarea 5. Regulation of fisheries in Subarea 5 and Statistical Area 6 (overall TAC 923,000 tons and allocations for 1974; commitment 850,000 tons and allocations for 1975 and commitment for 1976; species TACs and allocations; reporting procedures) proposed in 1973 (Ann. Rept. Vol. 24, pp. 27-29).
- 4) Redfish in 4VWX, and in 5. Regulation of fisheries in the Convention Area and Statistical Area 6 (TAC and allocations for 54 stocks in the Convention Area and overall TAC and allocation of whole group of stocks in Subarea 5 and Statistical Area 6 for 1975) proposed in 1974 (Ann. Rept. Vol. 24, pp. 101-104).
- 5) Redfish in 5. Regulation of fisheries by catch quota in the Convention Area and Statistical Areas 0 and 6 (for 1976; TACS and allocations for 49 stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 25, p. 94-96).
- 6) Redfish in 4VWX. Amendment to regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TAC and allocations for nine stocks deferred from 1975 Annual Meeting and revised allocations for 19 stocks agreed at 1975 Annual Meeting; revised allocation for the group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 26, pp. 42-43).

¹ For a more detailed discussion of the management activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries, see Annex 3, Vol. II.

- 7) Redfish in 4VWX, and in 5. Regulation of fisheries by catch quota in the Convention Area and Statistical Areas 0 and 6 [for 1977; TACs and national allocations for 51 stocks (first tier)] proposed in 1976 (Ann. Rept. Vol. 26, pp. 115-118).

After extending its fisheries jurisdiction to 200 nautical miles, Canada recognized explicitly or implicitly the separateness of redfish stocks in subareas 4 and 5 in the following actions:

- 1) TACs for redfish in 4RST and in 4VWX for 1978 and 1979 (CAFSAC Ann. Rept. Vol. 1, p. 23).
 - 2) TACs for redfish in 4RST and in 4VWX for 1980 (CAFSAC Ann. Rept. Vol. 2, p. 21).
 - 3) TACs for redfish in 4RST and in 4VWX for 1981 (CAFSAC Ann. Rept. Vol. 3, p. 10).
 - 4) TACs for redfish in 4RST and in 4VWX for 1982 (CAFSAC Ann. Rept. Vol. 4, p. 11).
 - 5) TACs for redfish in 4RST and in 4VWX for 1983 (CAFSAC Adv. Doc. 82/13).
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Appendix G to Annex 1

YELLOWTAIL FLOUNDER

Separate yellowtail flounder stocks in Subareas 4 (off Nova Scotia) and 5 (off New England) as well as separate stocks of other flounder such as witch flounder, winter flounder, and American plaice, were recognized explicitly or implicitly in the following actions taken by ICNAF¹:

- 1) Regulations of cod, haddock, and flounder trawl fisheries in Subarea 4; substitutes for 1955, 1956, and 1957 proposals (four-and-one-half inch mesh size; mesh measurements; 5,000 pound or 10 per cent trip exemption; savings gear) proposed in 1961 (Ann. Proc. Vol. 11, pp. 17-18).
- 2) Amendment to regulation of cod, haddock, and flounder trawl fisheries in Subarea 4 adopted in 1961 (savings gear) proposed in 1963 (Ann. Proc. Vol. 13, p. 16).
- 3) Amendment to a regulation of the cod, haddock, and flounder trawl fisheries in Subarea 4 adopted in 1961 (Manila twine and ICNAF gauge as standard) proposed in 1964 (Ann. Proc. Vol. 14, pp. 16-17).
- 4) Amendment to regulation for cod, haddock, and flounder in Subarea 4 adopted in 1965 (extends exemption) proposed in 1965 (Ann. Proc. Vol. 15, p. 19).
- 5) Codification of regulations in Subareas 1, 2, 3, and 4 proposed in 1961, with amendments adopted in 1963, 1964 and, 1965 (proposed in 1965) (Ann. Proc. Vol. 15, pp. 19-24).
- 6) Amendments to trawl regulations adopted for Subarea 4 in 1955, 1961, 1964, and 1965; and in Subarea 5 in 1964 (5 kg. pressure or pull; measure 20 consecutive meshes or codend) proposed in 1967 (Ann. Proc. Vol. 17, p. 20).
- 7) Regulation of yellowtail flounder in Subarea 5 (for 1971, catch quotas of 16,000 tons east of 69 degrees West and 13,000 tons west of 69 degrees West) proposed in 1970 (Ann. Proc. Vol. 20, p. 27).

¹ For a more detailed discussion of the management activities of the United States and Canada under the *International Convention for the Northwest Atlantic Fisheries*, see Annex 3, Vol. II.

- 8) Regulation of cod, haddock, and yellowtail flounder trawl fisheries in Subarea 5: substitutes for regulation adopted in 1955, 1956, 1957, 1963, 1964, and 1967 (adds yellowtail flounder) proposed in 1970 (Ann. Proc. Vol. 20, p. 27).
- 9) Further regulation of yellowtail flounder in Subarea 5 (review annually, catch quota of 16,000 tons east of 69 degrees West and 10,000 tons west of 69 degrees West) proposed in 1971 (Ann. Proc. Vol. 21, p. 29-30).
- 10) Amendment to regulation adopted for Subarea 5 (deletes alternative gauges, 130-mm mesh size for yellowtail flounder) proposed in 1971 (Ann. Proc. Vol. 21, pp. 30-31).
- 11) Amendment to regulation adopted for Subarea 4 in 1965 (deletes alternative gauges) proposed in 1971 (Ann. Proc. Vol. 21, p. 31).
- 12) Further regulation of yellowtail flounder fishery east of 69 degrees West in Subarea 5 (16,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 53).
- 13) Further regulation of yellowtail flounder fishery west of 69 degrees West in Subarea 5 (10,000-ton quota for 1973, national allocation, daily catch record) proposed in 1972 (Ann. Proc. Vol. 22, p. 54).
- 14) Amendment to regulation of the cod, haddock, and flounder trawl fisheries in Subarea 4 [114-mm. (four-and-one-half inches) mesh size in netting other than codend; 130-mm. (five-and-one-half inches) mesh size in codend] proposed in 1972 (Ann. Proc. Vol. 22, p. 64).
- 15) Amendment to regulation of cod, haddock, and yellowtail flounder in Subarea 5 [114-mm. (four-and-one-half inches) mesh size in netting other than codend; 130-mm. (five-and-one-half inches) mesh size in codend] proposed in 1972 (Ann. Proc. Vol. 22, p. 65).
- 16) Regulation of the fishery for flounders (except yellowtail) from the Southern New England stock (25,000-ton quota for 1973, national allocation) proposed in 1973 (Ann. Rept. Vol. 23, p. 32).
- 17) Regulation of the yellowtail, witch, and American plaice fishery in Div. 4V, 4W, and 4X of Subarea 4 (32,000-ton quota for 1974; national allocation) proposed in 1973 (Ann. Rept. Vol. 23, p. 84).
- 18) Subarea 5 (East of 69 degrees) and Subarea 5 (West of 69 degrees) yellowtail stocks and other flounders in Subarea 5 and Statistical Area 6. Regulation of fisheries in Subarea 5 and Statistical Area 6 (overall TAC 923,000 tons and allocations for

- 1974; commitment 850,000 tons and allocation for 1975 and commitment for 1976; species TACs and allocations; reporting procedures) proposed in 1973 (Ann. Rept. Vol. 24, pp. 27-29).
- 19) Amendment to regulation for cod, haddock, and flounder in Subarea 4, adopted in 1965 (details exemptions) proposed in 1974 (Ann. Rept. Vol. 24, p. 93).
 - 20) Amendment to regulation for cod, haddock, and yellowtail flounder trawl fisheries in Subarea 5 (details exemptions) proposed in 1974 (Ann. Rept. Vol. 24, p. 94).
 - 21) Amendments to yellowtail flounder fishery in Subarea 5 west of 69 degrees West and Statistical Area 6 (commitment to determine TAC and allocation at Special Meeting) proposed in 1974 (Ann. Rept. Vol. 24, p. 100).
 - 22) Yellowtail in Subarea 5 (East of 69 degrees) and Subarea 5 (West of 69 degrees) and Subarea 6, yellowtail, witch, and American plaice (combined) in Div. 4VWX, and flounders (except yellowtail) in Subarea 5 and 6. Regulation of fisheries in the Convention Area and Statistical Area 6 (TAC and allocations for 54 stocks in the Convention Area and overall TAC and allocation of whole group of stocks in Subarea 5 and Statistical Area 6 for 1975) proposed in 1974 (Ann. Rept. Vol. 24, pp. 101-104).
 - 23) Further amendments to regulation of yellowtail flounder fishery in Subarea 5 west of 69 degrees West and Statistical Area 6 (sets TAC and allocation for 1975) proposed in 1974 (Ann. Rept. Vol. 25, p. 30).
 - 24) Amendment to regulation of yellowtail flounder fishery in Subarea 5 east of 69 degrees West [amends TAC and allocations for 1975 set by proposal (13) at June 1974 Meeting] proposed in 1974 (Ann. Rept. Vol. 25, p. 31).
 - 25) Yellowtail in Subarea 5 (East of degrees) and Subarea 5 (West of 69 degrees) and Subarea 6, flounder in 4VWX, and flounder (except yellowtail in Subareas 5 and 6. Regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TACs and allocations for 49 stocks (first tier); TACs and allocations for whole group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 25, pp. 94-96).
 - 26) Amendment to regulation for cod, haddock, and flounder trawl fisheries in Subarea 4 (exemption of 2,500 kg. 5,510 lb.) or 10 per cent by weight) proposed in 1975 (Ann. Rept. Vol. 26, p. 40).

- 27) Amendment to regulation for cod, haddock, and yellowtail flounder trawl fisheries in Subarea 5 (exemption of 2,500 kg. (5,510 lb.) or 10 per cent by weight) proposed in 1975 (Ann. Rept. Vol. 26, p. 41).
- 28) (Haddock in Div 4X included in:) Amendment to regulation of fisheries by catch quota in Convention Area and Statistical Areas 0 and 6 (for 1976; TAC and allocations for nine stocks deferred from 1975 Annual Meeting and revised allocations for 19 stocks agreed at 1975 Annual Meeting; revised allocation for the group of stocks in Subarea 5 and Statistical Area 6) proposed in 1975 (Ann. Rept. Vol. 26, pp. 42-43).
- 29) Yellowtail in Subarea 5 (East of 69 degrees) and Subarea 5 (West of 69 degrees) and Subarea 6 and flounder (except yellowtail) in Subareas 5 and 6. Regulation of fisheries by catch quota in the Convention Area and Statistical Areas 0 and 6 [for 1977; TACs and national allocations for 51 stocks (first tier)] proposed in 1976 (Ann. Rept. Vol. 26, pp. 115-118).
- 30) (Flounder in 4VW included in:) Regulation of the fisheries by catch quota in the Convention Area and Statistical Area 6 (for 1977; TACs and allocations for nine stocks (first-tier) deferred from 1976 Annual Meeting (proposed eight) and TAC and allocation for group of stocks (collectively) (second-tier) in Subarea 5 and Statistical Area 6) proposed in 1976 (Ann. Rept. Vol. 27, p. 45).

After extending its fisheries jurisdiction to 200 nautical miles, Canada recognized explicitly or implicitly the separateness of flounder stocks in Subareas 4 and 5 in the following actions:

- 1) TACs for American plaice in 4T, witch in 4RS, and flatfish in 4VWX for 1978 (CAFSAC Ann. Rept. Vol. 1, p. 23).
- 2) TACs for American plaice in 4T, witch in 4RS, and flatfish in 4VWX for 1979 (CAFSAC Ann. Rept. Vol. 1, p. 23).
- 3) TACs for American plaice in 4T, witch in 4RS, and flatfish in 4VWX for 1980 (CAFSAC Ann. Rept. Vol. 2, p. 21).
- 4) TACs for American plaice in 4T, witch in 4RS, and flatfish in 4VWX for 1981 (CAFSAC Ann. Rept. Vol. 3, p. 10).
- 5) TACs for American plaice in 4T, witch in 4RS, and flatfish in 4VWX for 1982 (CAFSAC Ann. Rept. Vol. 4, p. 11).
- 6) TACs for American plaice in 4T, witch in 4RS, and flatfish in 4VWX for 1983 (CAFSAC Adv. Doc. 82/13).

Appendix H to Annex 1**SCALLOPS**

Separate populations of scallops in Subareas 4 (off Nova Scotia) and 5 (off New England) were recognized explicitly or implicitly in the following actions taken by ICNAF¹:

- 1) Regulation of the fishery for sea scallops in Div. 5Z of Subarea 5 (shell size 95mm., average 40 meats per pound) proposed in 1972 (Ann. Proc. Vol. 22, p. 66).
- 2) Amendment to regulation of sea scallop fishery in Div. 5Z of Subarea 5 (shell size 95mm.; 40 meats per pound; exemption per cent average count) proposed in 1976 (Ann. Rept. Vol. 26, p. 112).

After extending its fisheries jurisdiction to 200 nautical miles, Canada recognized explicitly or implicitly the separateness of scallop resources in Subareas 4 and 5 in the following CAFSAC advice:

- 1) Meat counts and/or effort controls for Northumberland Strait, Browns and German Banks, and Bay of Fundy stocks for 1980. (CAFSAC Ann. Rept. Vol. 3, p. 14).
- 2) Meat counts and/or closed areas for Northumberland Strait and Bay of Fundy stocks for 1981 (CAFSAC Ann. Rept. Vol. 4, p. 15).

¹ For a more detailed discussion of the management activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries, see Annex 3, Vol. II.

Appendix I to Annex I

PHYTOPLANKTON CONCENTRATIONS THROUGH THE YEAR

Figures 58 and 59 are Coastal Zone Color Scanner (C.Z.C.S.) Images, computer-generated from data acquired by the Nimbus 7 satellite, illustrating the annual progression of phytoplankton production in the Gulf of Maine area. The images show the surface distribution of chlorophyll and other pigments. Pigment concentrations are indicated in color, from deep blue to red. Deep blue represents minimal amounts of pigment (less than .2 micrograms per liter), green represents from 1.0 to 1.2 micrograms of pigment per liter, and red represents more than 20 micrograms of pigment per liter. For a detailed description of the use of C.Z.C.S. for the determination of pigments, see H.R. Gordon, D.K. Clark, J.L. Mueller, and W.A. Hovis, "Phytoplankton Pigments from the Nimbus-7 Coastal Zone Color Scanner: Comparisons with Surface Measurements", in *Science*, Vol. 210, 1980, pp. 63-66; and H.R. Gordon, D.K. Clark, J.W. Brown, O.B. Brown, R.H. Evans, and W.W. Broenkow, "Phytoplankton pigment concentrations in the Middle Atlantic Bight: comparison of ship determinations and CZCS estimates", in *Applied Optics*, Vol. 2, No. 1, 1983, pp. 20-36.

Appendix J to Annex 1

SOURCE OF FIGURE 52, ZOOGEOGRAPHIC PROVINCES – AS DEPICTED IN STUDY PUBLISHED BY THE NOVA SCOTIA INSTITUTE OF SCIENCE (E. L. BOUSFIELD AND M. L. H. THOMAS, "POSTGLACIAL CHANGES IN THE DISTRIBUTION OF LITTORAL MARINE INVERTEBRATES IN THE CANADIAN ATLANTIC REGIONS", IN *PROCEEDINGS OF THE NOVA SCOTIA INSTITUTE OF SCIENCE*, VOL. 27, SUPP. 3, 1975, PP. 47-60)

[Not reproduced]

Appendix K to Annex 1

BATHYMETRIC DATA BASE USED TO DEVELOP FIGURES 2, 3, 4, 5, 6, 8 AND 9

[Not reproduced]

Appendix L to Annex 1

FISHES OF THE GULF OF MAINE AREA (H. B. BIGELOW AND W. C. SCHROEDER, "FISHES OF THE GULF OF MAINE", IN *FISHERY BULLETIN* 74, VOL. 53, 1953, PP. iii-1, AND LIST OF CHANGES IN NAMES AND CLASSIFICATION, PP. 1-2)

[Not reproduced]

Volume I. Part B

Annex 2

ENVIRONMENTAL RISKS OF HYDROCARBON DEVELOPMENT ON THE NORTHEASTERN PORTION OF GEORGES BANK*

PREFACE

This Annex discusses the potential effect of a discharge of oil on the northeastern portion of Georges Bank upon the marine environment of the Gulf of Maine area. Chapter I describes the paths that oil discharged on the northeastern portion of Georges Bank likely would follow within the water column. Chapter II discusses the potential effects that such a discharge would have upon the marine environment of Georges Bank and the southern New England shelf.

* Prepared on the basis of contributions from: Dr. Robert L. Edwards, Special Assistant to the Assistant Administrator of Fisheries, National Oceanic and Atmospheric Administration (N.O.A.A.) and Lieutenant Commander Robert Pawlowski, N.O.A.A. Commissioned Corps, Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., United States Department of Commerce; and Dr. Mark Reed, Mr. Eric L. Anderson, and Dr. Malcolm L. Spaulding, of Applied Science Associates, Inc.

INTRODUCTION

1. The marine environment of Georges Bank is varied and productive, and contains many different species of fish and shellfish¹. The risk of damage to that environment through an oil-well "blowout" or other accidental release of oil has been a source of concern to the United States since the United States first began to consider the possible development of oil and gas resources beneath the seabed in that area². The risks to the marine environment of a potential blowout, while difficult to assess precisely, must be taken into consideration in the management and development of the Gulf of Maine area.

2. If a blowout were to occur on the seabed, the oil would affect the entire water column. If the blowout occurred higher in the water column (such as at the working level of the rig), it would affect the upper layers of the water column more than the lower levels. Even a discharge at the upper layers of the water column would have some effect upon the lower levels, as a result of vertical-turbulence mixing, sinking of the heavier fractions of the oil, and incorporation into plankton fecal pellets.

¹ See Annex 1, Vol. I, The Marine Environment of the Gulf of Maine Area.

² A notorious oil and gas blowout occurred in the Bay of Campeche in the Gulf of Mexico on 3 June 1979. The blowout (also known as the IXTOC blowout) continued until it was brought under control on 27 March 1980. It was estimated that 103 million gallons of oil were discharged (of which only six million were recovered).

³ The protection of the marine and coastal environments has been a major policy objective of the United States since the passage of the Outer Continental Shelf Lands Act of 1953 (O.C.S.L.A.). This policy is based upon the legislative mandates of both the O.C.S.L.A. [United States Memorial, Annex 9, Vol. I] and the National Environmental Policy Act of 1969 (N.E.P.A.) [United States Memorial, Annex 10, Vol. I]. N.E.P.A. requires that all federal agencies work together to ensure the combined use of the natural and social sciences in any planning and decisionmaking that may affect the environment. Responses by the Bureau of Land Management, U.S. Dept. of the Interior, to these requirements include the formation of Environmental Assessment Teams, preparation and publication of Environmental Impact Statements (E.I.S.), and the sponsorship of contract studies. These studies include environmental monitoring and assessments of the effects of oil and gas operations. Draft and final E.I.S. relating to the Gulf of Maine area previously were deposited with the Court pursuant to Article 50 (2) of the Rules of Court. See also the Aide-Memoire from the Dept. of State to the Embassy of Canada, dated 10 May 1968. United States Memorial, Annex 55, Vol. IV. In this Aide-Memoire, the United States stressed the need for protection of "the living resources of the sea against the pollution and disturbance which might result from mineral exploration and exploitation", and referred specifically to the need to protect the fishery resources of Georges Bank.

135 3. The fate of oil after it is discharged into the marine environment is determined by a complex process of weathering, that involves evaporation, emulsification, dispersion, dissolution, assimilation, and degradation of the oil. This process is depicted in Figure 1¹. Crude oil contains a wide range of hydrocarbon compounds, many of which are volatile and water soluble. Other such compounds are heavy and tar-like, settling to the bottom as they are weathered. Of these hydrocarbon compounds, many are known to be toxic or carcinogenic, or both. The complex mixture varies with each type of crude oil. In view of the concentrations of these various compounds that are present in all crude oil, however, and in view of the years of research demonstrating the toxic biological effects of crude oil upon marine organisms², scientists generally agree that oil spills are of major environmental concern.

4. Living marine resources and, in particular, the eggs and larvae of fish and shellfish, are placed at risk if they are within the path of discharged oil. The timing and magnitude of the spill, the dynamics of the area, and the living resources present there all combine to determine the degree of risk. With respect to Georges Bank, this risk is considered to be substantial because of the gyre in which water circulates around the Bank, the strong vertical mixing of the water column, the year-round spawning that occurs on the Bank, and because the Bank as a whole serves as a nursery ground for many stocks.

¹ Because the water over Georges Bank is particularly well-mixed vertically, oil discharged into the upper layers would affect the entire water column.

135 ² Figure 1 is reproduced from R. Burwood and G.C. Speers, "Some Chemical and Physical Aspects of the Fate of Crude Oil in the Marine Environment", *Advances in Organic Geochemistry 1973*, Proceedings of the 6th International Meeting on Organic Chemistry, 1973, pp. 1005-1027. See Appendix D for the source of Figure 1.

CHAPTER I

OIL DISCHARGED INTO THE WATER COLUMN OVER THE NORTHEASTERN PORTION OF GEORGES BANK LIKELY WOULD REMAIN ON THE BANK AND BE TRANSPORTED ALONG THE BANK TO THE SOUTHWEST

5. It is possible to determine the path that oil likely would follow after a discharge on the northeastern portion of Georges Bank. This requires a knowledge of: (a) the pattern in which water circulates through the Gulf of Maine area; (b) other water dynamics, such as tides and the degree of vertical mixing; and (c) the direction and force of winds.

6. Oil dissolved in the water column generally follows the local water circulation pattern. Because water over Georges Bank circulates in a clockwise gyre¹, it is reasonable to assume that water-soluble fractions of oil released into the water column on the northeastern portion of Georges Bank would be transported around the Bank by the gyre. Similarly, given the overall circulation pattern and the water dynamics of Georges Bank, of the Northeast Channel, and of the Scotian Shelf², it is reasonable to anticipate that oil discharged into the water column above Georges Bank would not cross the Northeast Channel to the Scotian Shelf³.

7. This analysis is confirmed through use of computer models. Such models combine information on the forces that create water-circulation

¹ D.J. Scarratt, "Impact of Spills and Clean-Up Technology on Living Natural Resources, and Resource-Based Industry", *Summary of Physical, Biological, Socio-Economic and Other Factors Relevant to Potential Oil Spills in the Passamaquoddy Region of the Bay of Fundy*, Fisheries Research Board of Canada, Tech. Rpt. No. 428, 1974, pp. 141-159.

² See Annex 1, Vol. I, para. 17 and Figure 8; United States Memorial, para. 41; and Canadian Memorial, para. 91 and Figure 20.

³ See Annex 1, Vol. I, Chapter I, and Figures 8 and 9.

⁴ At the surface of the water column, a layer of oil floats, sometimes accompanied by "mousse", or a combination of oil and water. The direction taken by this surface layer, or slick, is determined largely by the prevailing winds. For most of the year, the prevailing winds over Georges Bank would drive this slick out to sea. The risk of the slick being driven towards the coasts in the Gulf of Maine area is minimal, and the oil would be thoroughly weathered in transit. In an article cited by Canada [Canadian Memorial, para. 175], it was indicated that, during the one season of the year in which the prevailing winds blow towards the coast, there is a slight possibility that oil floating at the surface could reach the coast of Canada, two months after it was released on Georges Bank. E. L. Anderson and M. L. Spaulding, "Application of an Oil Spill Fates Model to Environmental Management on Georges Bank", in *The Environmental Professional*, Vol. 3, 1981, pp. 119-132.

patterns, including tidal, wind, density, and pressure-gradient forces, and calculate the trajectory of oil discharged from a given point at a given time of the year. Figures 2 and 3 show plots of computer estimates of the paths that oil released into the water column would follow after a discharge at two different points on the northeastern portion of Georges Bank¹.

8. Figures 2 and 3 illustrate the paths that oil would follow if it were released at Point X or at Point Y², respectively, on the northeastern portion of Georges Bank, at four different times during the year³. In these figures, the distribution of oil in the uppermost ten meters of the water column is depicted in green, and that of the oil in the bottom ten meters is depicted in red⁴. These trajectories for the bottom ten and uppermost ten meters of the water column together indicate the movement of the oil within the water column as a whole.

9. As would be expected from the pattern of water circulation on Georges Bank, oil released at these points likely would proceed southwestward along the seaward side of Georges Bank. In its progression over Georges Bank, oil discharged into the uppermost ten meters of the water column at Point X would cover an area measuring between approximately 6,500 square kilometers and 18,900 square kilometers⁵. Oil in the bottom ten meters would cover an area of Georges Bank measuring between approximately 3,000 square kilometers and 5,000 square kilometers. Oil discharged into the uppermost ten meters of the water column at Point Y would cover an area of Georges Bank measuring between approximately

¹ The bases for Figures 2 and 3 are contained in Appendices A and B, which depict the oil-spill trajectories at 15, 30, 60, and 90 days after each hypothetical discharge. These estimates assume a discharge of 68 million gallons of oil over 30 days. Also depicted in each case is the total area that, during the 90 days following the discharge, would be affected by concentrations of 50 parts per billion or more. Appendix C describes the computer model system used to develop the trajectories.

² Point X is at 41.5° North Latitude, 67° West Longitude, and Point Y is at 41.9° North Latitude, 66.3° West Longitude.

³ The discharge dates used were Julian day 32 (1 February) for winter; day 121 (1 May in a non-leap year) for spring; day 213 (1 August in a non-leap year) for summer; and day 305 (1 November in a non-leap year) for fall.

⁴ The trajectory of oil in the bottom ten meters is of particular importance in estimating the effect upon organisms that dwell or spawn on the bottom. In addition, oil assimilated into sediments can remain for many years, altering the faunal community and organism behavior. Oil in the uppermost ten meters is important in estimating the effect on marine organisms that are pelagic (i.e., swim or float near the surface) in their early (i.e., egg and larval) stages of development. Most marine species of commercial importance have pelagic eggs or larvae, or both.

⁵ This is the area of Georges Bank, within the 100-meter-depth contour, that would be subjected to oil concentrations of 50 parts per billion or greater, assuming a discharge of 68 million gallons over 30 days.

3,100 square kilometers and 9,900 square kilometers. Oil discharged into the bottom ten meters of the water column at Point Y would cover an area of Georges Bank measuring between approximately 1,500 square kilometers and 5,400 square kilometers.

10. Because of the water dynamics of Georges Bank, of the Northeast Channel, and of the Scotian Shelf, oil discharged into the water column on the northeastern portion of the Bank in all likelihood would not cross the Northeast Channel to the Scotian Shelf.

CHAPTER II

OIL DISCHARGED INTO THE WATER COLUMN ON THE NORTH-EASTERN PORTION OF GEORGES BANK WOULD DAMAGE THE MARINE RESOURCES OF THE ENTIRE BANK

11. The pattern in which water circulates in the Georges Bank regime and the productivity of that regime make it particularly susceptible to damage from a hydrocarbon discharge. As the final environmental impact statement for Outer Continental Shelf Lease Sale No. 52¹ stated:

"Fish spawn on Georges Bank almost all year long. . . . Timing would be a critical factor in determining which species or year class would be impacted. The physical oceanographic conditions of the Georges Bank crest are believed to lead to the retention of fish eggs and larvae. Any oil spill impacting this area during spawning could have a significant impact on the particular resource. . . .

Any major impact by an oil spill affecting one element of the food web could result in significant shifts throughout the ecological system²."

12. The water-soluble fraction of discharged oil, even when diluted in the ocean, is toxic to marine organisms. Zooplankton are particularly sensitive³; nevertheless, because many species have reproductive cycles of several weeks⁴, the recovery of these planktonic populations is relatively rapid after the spilled oil has dissipated or been transported away from an area. The eggs and larvae of fish and shellfish, including those of important commercial species, such as cod, herring, and lobster, also are particularly sensitive to the effects of small amounts of hydrocarbons⁵. Because fish usually spawn only once a year, and because they are

¹ Final Environmental Impact Statement, Outer Continental Shelf Lease Sale No. 52, Bureau of Land Management, United States Dept. of the Interior, 1982, materials previously deposited with the Court pursuant to Article 50(2) of the Rules of Court.

² *Ibid.*, p. 263.

³ O.G. Mironov, "The Effect of Oil Pollution Upon Some Representatives of the Black Sea Zooplankton", *Zoologicheskii Zhurnal*, Vol. 48, No. 7, 1969, pp. 980-984. [In Russian with English abstract.] For English translation, see *Canada Fisheries and Marine Service Translation Series*, No. 2140.

⁴ The reproductive cycle is the time it takes for an egg to hatch and to grow to a sexually mature adult.

⁵ H. Rosenthal and D.F. Alderdice, "Sublethal Effects of Environmental Stressors, Natural and Pollutional, on Marine Fish Eggs and Larvae", in *Journal of the* (Footnote continued on next page)

particularly sensitive during their early life stages, the discharge of oil into the water column during or shortly after a spawning season can damage any stock that spawns in the path of the discharge.

13. Many stocks of commercially valuable species spawn on the northeastern portion of Georges Bank, at various times of the year. Because most of these fish and shellfish belong to stocks that range over the entire Bank, damage to the eggs and larvae or to adult fish and shellfish on the northeastern portion of the Bank would affect the present and future abundance of such resources throughout the Bank.

14. For example, Atlantic cod spawn in the spring on the northeastern portion of Georges Bank¹. The sensitivity of cod eggs and larvae to crude oil was demonstrated by the effects of the *Argo Merchant* spill². Oil discharged on the northeastern portion of Georges Bank, at or about the time of spawning, would pass through the larval concentrations on the southern side of Georges Bank, killing larvae in its path. See Figure 4³.

15. Haddock would suffer a similar plight if oil were discharged on the northeastern portion of Georges Bank during spawning season. Because the northeastern portion of Georges Bank is a major spawning ground for haddock¹, oil discharged in this area during spawning season would

(Footnote continued from previous page)

Fisheries Research Board of Canada, Vol. 33, 1976, pp. 2047-2065; W.W. Kühnhold, "Investigations on the Toxicity of Seawater-Extracts of Three Crude Oils on Eggs of Cod (*Gadus morhua* L.)", in *Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung*, Vol. 23, 1974, pp. 165-180; O. Lindén, "Biological Effects of Oil on Early Development of the Baltic Herring *Clupea harengus membras*", in *Marine Biology*, Vol. 45, No. 3, 1978, pp. 273-283; and P.G. Wells and J.B. Sprague, "Effects of Crude Oil on American Lobster (*Homarus Americanus*) Larvae in the Laboratory", in *Journal of the Fisheries Research Board of Canada*, Vol. 33, No. 1, 1976, pp. 1604-1614.

¹ See Annex 1, Vol. I, and Figure 30 therein.

² On 15 December 1976, the tanker *Argo Merchant* ran aground southeast of Nantucket Island, spilling 7.7 million gallons of No. 6 fuel oil. P.L. Grose and J.S. Mattson, eds., *The Argo Merchant Oil Spill: A Preliminary Scientific Report*, National Oceanic and Atmospheric Administration, United States Dept. of Commerce, 1977; W.W. Kühnhold, "Effects of the Water Soluble Fraction of a Venezuelan Heavy Fuel Oil (No. 6) on Cod Eggs and Larvae", International Council for the Exploration of the Sea (I.C.E.S.), Fisheries Improvement Committee, 1977.

³ Figure 4 combines the appropriate seasonal oil trajectories from Figures 2 and 3, above, with Figure 31 from Annex 1, Vol. I, showing typical distributions of cod larvae.

damage the eggs and larvae of the entire Georges Bank stock. See Figure 5¹.

16. The Georges Bank stock of yellowtail flounder is another stock that could be harmed by a discharge of oil on the northeastern portion of the Bank. Yellowtail flounder is a flatfish. The effects of oil on flatfish larvae are shown in Table A². Yellowtail flounder spawn on the northeastern portion of Georges Bank during the early summer, and oil discharged in that area during that season would pass through yellowtail larvae concentrations, damaging the larvae in its path, and consequently damaging the entire Georges Bank yellowtail stock. See Figure 6³.

17. Herring provide a vivid example of the damage that hydrocarbon development of the northeastern portion of the Bank could wreak upon an entire Georges Bank fish stock. Herring spawn on the seabed and require a particular type of sediment for their spawning. Their primary spawning areas are on the northeastern portion of Georges Bank⁴. Oil discharged in this area would pollute the seabed, and affect not only the eggs in the area at the time of the discharge, but also eggs spawned in subsequent years. Herring larvae are sensitive to the toxic effects of hydrocarbons dissolved in water⁵. After hatching, herring larvae become pelagic and are dispersed over Georges Bank. These larvae would be damaged by contact with oil discharged on the northeastern portion of Georges Bank as it subsequently passes southwestward along the remainder of the Bank. See Figures 7 and 8⁶.

¹ Figure 5 combines the appropriate seasonal oil trajectories from Figures 2 and 3, above, with Figure 36 from Annex 1, Vol. I, showing typical distributions of haddock larvae.

² Table A summarizes the consequences of exposure of flatfish larvae to oil. Flatfish larvae incubated in the water-soluble fraction of Prudhoe Bay crude oil were either sublethally deformed or lethally (grossly) deformed. Table A is based upon the 9 November 1979 testimony of D. C. Malins before the Environmental Protection Agency, Region 1, on behalf of the National Oceanic and Atmospheric Administration and the New England Fisheries Management Council, regarding the Laboratory Studies of the Impact of Oil on Marine Organisms. This testimony is contained in the file of Permit Application No. ME0022420, submitted by the Pittston Company to the Environmental Protection Agency. See Appendix E for the source of Table A.

³ Figure 6 combines the appropriate seasonal trajectories from Figures 2 and 3, above, with Figure 41 from Annex 1, Vol. I, showing typical distributions of yellowtail flounder larvae.

⁴ Annex 1, Vol. I, and Figure 30 therein.

⁵ Lindén, *op. cit.*

⁶ Figure 7 combines the appropriate seasonal trajectories from Figures 2 and 3, above, with Figure 33 from Annex 1, Vol. I, showing distributions of herring larvae in three different years. In 1980, the herring stock on Georges Bank was so depleted that not even one larva per 10 square meters of surface area was taken during the September-October survey upon which this Figure is based. Figure 8 combines the appropriate seasonal trajectories from Figures 2 and 3, above, with Figure 34 from Annex 1, Vol. I, showing typical progressions of herring larvae distributions through a period of six weeks and through a period of eight weeks.

TABLE A

Results of Incubation of Flatfish Larvae in Water-Soluble Fraction of Prudhoe Bay Crude Oil

Exposed Larvae ¹ Grossly Deformed (lethal)	Exposed Larvae Deformed (sublethal)	Control Group Unexposed to Oil
Hatched dead	Hatched alive	Hatched alive
Body length: shortened 0.96 mm SL ²	Slightly shorter 2.3 mm SL	2.9 mm SL
Body shape: amorphous blob	Normal shape	Normal shape
Yolk: none, or greatly reduced, occasionally ruptured	Yolk: full-size, but posterior body occasionally fused	Yolk: normal ellipse shaped body, free and straight
Anus and lower digestive tract never form	Complete	Complete
Notochord body withered	Gross notochord curva- ture single or multiple (scoliosis)	Straight notochord
Larvae lying dead on bottom of container	Narcotized, lying on bottom, little move- ment, only heart beat	Swimming in water
Pigment difficult to assess	Pigment cells (melano- phores) constricted to dots, occasionally missing from ventral body	Pigment cells expanded, each star-like in shape

¹ The larvae that were "grossly deformed" and those that were "deformed" were exposed equally to oil.

² "SL" indicates standard length.

18. The herring stock on Georges Bank is particularly susceptible to devastation, as the stock collapsed in 1976 and has not recovered¹. If there were an oil spill or blowout on the northeastern portion of Georges Bank during herring spawning season, particularly when the larvae were drifting in the water column, the entire year-class could be reduced severely. In addition, since the contamination of the seabed sediments can persist for several years, contamination of the spawning beds could delay even further the recovery of the stock.

19. Scallops are another marine resource that would be damaged by oil discharged on the northeastern portion of Georges Bank. Such a discharge would affect the scallop beds in the northeastern portion, as well as those in the southwestern portion of Georges Bank and even those farther down the southern New England shelf. Scallop larvae are pelagic and float in the water column. Some larvae spawned on the northeastern portion of the Bank are transported by the Georges Bank gyre to the southwestern portion of the Bank, supplying "spat" to another bed of scallops located there².

20. Because some water breaks out of the Georges Bank gyre and continues down the southern New England shelf, larvae from both the northeastern and the southwestern beds may be swept along the shelf, supplying spat to the scallop population on the mid-Atlantic shelf³. Damage done to the scallop bed on the northeastern end of Georges Bank would affect adversely the repopulation of the beds on the southwestern end and on the southern New England shelf.

21. The presence of oil in the water column and in the seabed sediments also can affect adult scallops directly. Oil transported within the water column by currents could remain toxic for two or three months, or even longer, following its discharge into the water column over Georges Bank. Even after it has lost its toxicity, the oil could affect bivalves,

¹ Canadian Memorial, para. 191.

² "Spat" are larval scallops as they change from a pelagic to a demersal (i.e., living on or near the seabed) state and settle to the seabed.

³ J.A. Posgay, "Population Assessment of the Georges Bank Sea Scallop Stocks", *Rapports et Procès Verbaux des Réunions, I.C.E.S.*, Vol. 175, 1979, pp. 109-113; F.M. Serchuk, P.W. Wood, J.A. Posgay, and B.E. Brown, "Assessment and Status of Sea Scallop (*Placopecten Magellanicus*) Populations off the Northeast Coast of the United States", *Proceedings from the National Shellfisheries Association*, Vol. 69, 1979, pp. 161-191.

⁴ Posgay, *op. cit.*; Serchuk *et al.*, *op. cit.*; F.M. Serchuk, "Growth, Shell Height-Meat Weight and Yield Per Recruit Relationships of Northwest Atlantic Sea Scallop Populations", *Northeast Fisheries Center (N.E.F.C.) Staff Study*, 1982, pp. 1-10; and F.M. Serchuk, "Biological Characteristics of Offshore Gulf of Maine Sea Scallop Populations: Size Distributions, Shell Height-Meat Weight Relationships and Relative Fecundity Patterns", *N.E.F.C., Woods Hole Laboratory Reference Doc. No. 83-07*, 1983, pp. 1.

including scallops. Oil can inhibit normal development of some bivalve species¹, and taint the tissue of the adults even after short-term exposure. Bivalves in areas of contaminated sediment are only able to depurate (i.e., cleanse their tissues) slowly, due to continued recontamination from the sediment².

22. Lobster similarly could be damaged by oil discharged on the northeastern portion of Georges Bank. Lobster normally live in the canyons or gullies along the seaward edge of Georges Bank, and climb onto the Bank to spawn. This migration covers almost the entire southern flank of the Bank³. As Figures 2 and 3 illustrate, oil discharged on the northeastern portion of Georges Bank would pass through this area. Female lobster carry their eggs under their tails as they migrate. The eggs, and the larvae hatched therefrom, would be damaged should they come into contact with oil. Oil suspended in the water column or contained in the seabed sediments also would prove fatal to adult lobster in the area. The damage would be compounded because of the sensitivity of the olfactory and chemosensory systems of the lobster to hydrocarbons. Lobster suffer behavioral changes as a result of contact with hydrocarbon concentrations, including: (a) shifts in migratory patterns, because they are attracted by the smell of oil; (b) disorientation in areas of high concentrations; and (c) difficulty in locating food⁴. Even if the oil were sufficiently weathered so as not to be toxic to lobster, the lobster could be tainted through ingestion of oil or as a result of direct contact either with oil in the bottom sediments or with contaminated fishing gear; as a result, such lobster would become unmarketable⁵.

¹ E.S. Gilfillan and J.H. Vandermeulen, "Alterations in Growth and Physiology of Soft-Shell Clams, *Mya arenaria*, Chronically Oiled with Bunker C from Chedabucto Bay, Nova Scotia, 1970-76", in *Journal of the Fisheries Research Board of Canada*, Vol. 35, 1978, pp. 630-636; and F.G. Johnson, "Sublethal Biological Effects of Petroleum Hydrocarbon Exposures: Bacteria, Algae, and Invertebrates", *Effects of Petroleum on Arctic and Subarctic Marine Environments and Organisms*, Vol. 2, 1977, pp. 271-318.

² R.F. Lee, "Accumulation and Turnover of Petroleum Hydrocarbons in Marine Organisms", *Fate and Effects of Petroleum Hydrocarbons in Marine Ecosystems and Organisms*, 1977, pp. 60, 65.

³ J.R. Uzmann, R.A. Cooper, and K.J. Pecci, "Migration and Dispersion of Tagged American Lobsters, *Homarus americanus*, on the Southern New England Continental Shelf", N.O.A.A. Tech. Rpt., N.M.F.S. SSRF-705, 1977, pp. 1-92; and R.A. Cooper and J.R. Uzmann, "Migrations and Growth of Deep-Sea Lobsters, *Homarus americanus*", in *Science*, Vol. 171, 1971, pp. 288-290.

⁴ J. Atema, "The Effects of Oil on Lobsters", *Oceanus*, 1977, Vol. 20, No. 4, pp. 68-73.

⁵ Such a marketing problem resulted from the contamination of lobster after the *Kurdestan* spill in the Bay of Fundy. J.H. Vandermeulen and D.J. Scarratt, "Impact of Oil Spills on Living Natural Resources and Resource-Based Industry", *Evaluation of Recent Data Relative to Potential Oil Spills in the Passamaquoddy Area*, Fisheries and Marine Service Tech. Rpt. No. 901, 1979, pp. 91-96. As a result of that spill, numerous claims were filed for compensation for fouling of lobster fishing gear by spilled oil.

CONCLUSION

23. In the event oil were discharged into the water column in the course of hydrocarbon development on the northeastern portion of Georges Bank, it would be transported in the circulation pattern over the Bank before it dissipated. Because the larvae of fish and shellfish are particularly susceptible to damage from oil, and because the northeastern portion of Georges Bank is a major spawning ground for important commercial stocks that range over the entire Bank, the Georges Bank stocks as a whole would be damaged by a discharge of oil during spawning season on the northeastern portion of the Bank. Furthermore, oil would be assimilated into the sediments on Georges Bank, and would continue to harm adult organisms, such as lobster and scallops, that live on the seabed. Due to the pattern in which water circulates over Georges Bank and the direction of the prevailing winds, it is highly unlikely that oil discharged into the water column above the northeastern portion of the Bank either would cross the Northeast Channel to the Scotian Shelf or reach the coasts in the Gulf of Maine area.

Appendix A to Annex 2**OIL-SPILL TRAJECTORIES FOR DISCHARGES AT POINT X***

[Not reproduced]

Appendix B to Annex 2**OIL-SPILL TRAJECTORIES FOR DISCHARGES AT POINT Y***

[Not reproduced]

Appendix C to Annex 2

**(137) DESCRIPTION OF THE COMPUTER MODEL SYSTEM USED TO DEVELOP APPENDICES
A AND B**

[Text not reproduced]

Appendix D to Annex 2

**(136) SOURCE OF FIGURE 1, PROCESSES INVOLVED IN THE FATE OF CRUDE OIL
DISCHARGED INTO THE MARINE ENVIRONMENT**

(R. Burwood and G. C. Speers, "Some Chemical and Physical Aspects of the Fate of Crude Oil in the Marine Environment", *Advances in Organic Geochemistry 1973*, Proceedings of the 6th International Meeting on Organic Chemistry, 1973, pp. 1005, 1007, Figure 1)

[Not reproduced]

* These trajectories were estimated using the computer model system described in Appendix C.

Appendix E to Annex 2**SOURCE OF TABLE A, RESULTS OF INCUBATION OF FLATFISH LARVAE IN
WATER-SOLUBLE FRACTION OF PRUDHOE BAY CRUDE OIL**

(D. C. Malins, testimony of 9 November 1979 before the Environmental Protection Agency, Region 1, on behalf of the National Oceanic and Atmospheric Administration and the New England Fisheries Management Council, regarding the Laboratory Studies of the Impact of Oil on Marine Organisms. Contained in the file of Permit Application No. ME 0022420 submitted by the Pittston Company to the Environmental Protection Agency, Table 3)

[Not reproduced]

Volume II

Annex 3

**THE ACTIVITIES OF THE UNITED STATES AND CANADA UNDER THE INTERNATIONAL
CONVENTION FOR THE NORTHWEST ATLANTIC FISHERIES (ICNAF)**

INTRODUCTION

1. This Annex examines the activities of the United States and Canada under the International Convention for the Northwest Atlantic Fisheries (ICNAF)¹.

2. The history of ICNAF illustrates two points of importance. First, the United States was the State with the predominant interest in Georges Bank. Indeed, the concern for its important Georges Bank fishery prompted the United States to propose the establishment of ICNAF; to call for, and to host, the diplomatic conference that produced the Convention; and to propose, and to press for, the adoption of nearly every major ICNAF innovation or amendment. That same concern also prompted the United States to conduct the bulk of the fisheries research in Subarea 5, the New England-Georges Bank area; to propose most of the fishery-management measures that ICNAF adopted concerning Subarea 5, as well as many that were not adopted; and to conduct the bulk of ICNAF-sanctioned enforcement activities on Georges Bank. The driving force behind ICNAF, from its inception in 1950 until the extension of coastal-State fishery jurisdiction in 1977, was the United States. In brief, ICNAF represented a major, sustained United States diplomatic campaign, motivated by the need of the United States to protect its traditional fishery on Georges Bank.

3. The second important point illustrated by the history of ICNAF is that Canada's fishing interests centered on the rich fishing grounds, stretching from Browns Bank to the Grand Banks of Newfoundland, off Canada's own coast. These grounds were part of ICNAF Subareas 3 and 4². Just as the United States assumed the leadership role in ICNAF with

¹ International Convention for the Northwest Atlantic Fisheries. Done at Washington, 8 February 1949, 157 U.N.T.S. 157. The text of the Convention is reprinted at Annex 45, Vol. III, of the United States Memorial, and at Vol. I, Annex 1, of the Canadian Memorial. It is reproduced again here in Appendix A in the "ICNAF Handbook". The acronym "ICNAF" is used to refer both to the Convention and to the Commission established thereunder. The United States withdrew from the Convention on 31 December 1976. ICNAF was superseded on 1 January 1979 by the entry into force of the Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa, 24 October 1978; entered into force 1 January 1979. The Convention established the Northwest Atlantic Fisheries Organization (NAFO). Canadian Memorial, Annexes, Vol. I, Annex 9. The United States is not a member of NAFO.

² Canada also had a significant interest in the fisheries to the north of the Grand Banks.

respect to Subarea 5, Canada assumed the leadership role with respect to the northern areas. Nearly all of Canada's fishery research, enforcement activities, regulatory proposals, and fishery allocations concerned Subareas 3 and 4.

4. The Canadian Memorial alleges that the United States and Canada were "coastal State partners" under the Convention with regard to Subarea 5, including Georges Bank¹.

5. Canada's characterization of the relationship between the Parties under ICNAF is misleading. It is true that, as coastal States in the region, the United States and Canada cooperated with each other to protect the Northwest Atlantic fisheries from the efficient distant-water fleets. Canada neglects, however, to mention that, while Canada was considered, for some purposes a coastal State for Subarea 5, the United States equally was considered a coastal State for Subarea 4, off Nova Scotia. In fact, the ICNAF coastal-State concept was used only in a general sense, to distinguish the North American from the distant-water fleets, and not to express a judgment concerning maritime jurisdiction. "Coastal State preference" was an important mutual defense tactic against these third-State fleets. Moreover, the "partnership", to the extent it existed, concerned the functioning of ICNAF as a whole, and not the separate Subareas. Canada concentrated its efforts in Subareas 3 and 4 and conducted comparatively little research, enforcement, or fishing in Subarea 5; similarly, the United States developed nearly all the regulatory proposals, conducted most of the research and enforcement activities, and *did most of its fishing in Subarea 5*.

6. This Annex contains six chapters. Chapter I describes the United States role in the formation of ICNAF. Chapter II outlines ICNAF's structure. Chapter III describes the United States leadership in seeking to make ICNAF effective, as evidenced by major proposals concerning the activities of the Commission as a whole. Chapter IV demonstrates that the United States proposed most of the management measures for Subarea 5, and that Canada proposed most of the management measures for Subarea 4. Chapter V demonstrates that the United States conducted most of the scientific research concerning Subarea 5, and that most of Canada's research concerned its fisheries in Subareas 3 and 4. Chapter VI describes the efforts of the United States and Canada to enforce the regulations adopted under the Convention, including the predominant role of the United States in enforcing the regulations in Subarea 5. Together the Chapters demonstrate that the history of ICNAF confirms that the United States has the predominant interest in Georges Bank, and that Canada's interests center on the major fishing grounds to the north.

¹ See Canadian Memorial, para. 322.

CHAPTER I

THE ROLE OF THE UNITED STATES IN THE FORMATION OF ICNAF REFLECTS THE HISTORICAL INTEREST OF THE UNITED STATES IN THE FISHERIES OF GEORGES BANK

SECTION 1. The United States Governmental Interest in the Georges Bank Fisheries is Longstanding

7. The United States proposed the establishment of ICNAF because of its concern for the conservation and management of the fisheries of the Northwest Atlantic Ocean, particularly the haddock fishery on Georges Bank. ICNAF was but one significant step in the long history of United States Government activities regarding Georges Bank.

8. As early as 1807, the Congress of the United States, in authorizing a survey of the coast, singled out Georges Bank as an area that was "subservient to the commercial interests of the United States":

"Sec. 2. *And be it further enacted*, That it shall be lawful for the President of the United States to cause such examinations and observations to be made, with respect to St. George's bank [sic], and any other bank or shoal and the soundings and currents beyond the distance aforesaid to the Gulf Stream, as in his opinion may be especially subservient to the commercial interests of the United States¹."

As the United States fishery on Georges Bank expanded during the 19th century, the United States Government increased its support of the fishing industry, both by providing aids to navigation² and by conducting research on the fishery resources³. The early work of the United States Fish Commission, established in 1871, concerned primarily the Gulf of Maine and Georges Bank⁴.

¹ An Act to provide for surveying the coasts of the United States. 10 Feb. 1807, Annals of Congress, 9th Congress, 2d Session, 1806-1807, Vol. 16, pp. 1252-1253. [Emphasis in original.] Reprinted at Appendix B.

² See United States Memorial, paras. 103-111 and its Annexes 26, 27, and 29, Vol. II.

³ *Ibid.*, paras. 121-123.

⁴ *Ibid.*, paras. 122-123, for a discussion of the Commission's early research activities. Cf. Bibliography, "Groundfish Investigations by the U.S. Government in the Northwest Atlantic" 1871-1952, submitted by the United States to ICNAF at the Second Annual Meeting, 1952, Meeting Doc. V(a). Reprinted at Appendix C1.

9. In the first part of the 20th century, Georges Bank haddock became the most important New England fishery. Between 1927 and 1934, however, haddock catches first rose sharply and subsequently dropped more than 75 per cent ¹. In 1931, the United States Government began an intensive research program to determine how to improve the stability of the haddock stock on Georges Bank ². The researchers suggested several regulations. One of these suggestions was adopted in 1936, when the New England fishing industry established a voluntary minimum mesh-size regulation for the Georges Bank haddock fishery ³.

SECTION 2. The United States Took the Initiative to Form a Multilateral Convention for the Conservation and Management of the Fisheries of the Northwest Atlantic Ocean

10. In the late 1940s, the United States Government, aware of increased concern in the New England fishing industry and in the United States Congress, accepted the need for mandatory regulation of the Georges Bank haddock fishery. Georges Bank at this time was fished almost exclusively by New England fishermen, but the United States Government was concerned that regulating only United States fishermen would not be effective. The United States view was that the fishing banks to the northeast should also be regulated. This view was founded upon the belief that, if the areas to the north were unregulated and overfished, not

¹ H. W. Graham, "Mesh Regulation to Increase the Yield of the Georges Bank Haddock Fishery", in *ICNAF Second Annual Report, 1951-1952*, pp. 23-33, reprinted at Annex 48, Vol. III, of the United States Memorial. At page 24, Dr. Graham describes the crisis in the Georges Bank haddock fishery during the early 1930s:

"The Georges Bank haddock fishery was, at certain times in the past, more productive than it is now. . . . During the early exploitation of this fishery there was one period (from 1927 through 1930) when landings were much higher than they had ever been before or have been since. This was due to the interaction of two factors: a great abundance of fish and intensified fishing. Previous to 1930 there was a relatively high abundance of haddock on the Bank. Although there was a decline in abundance from 1928 to 1930, there was a marked increase in fishing effort during these years, resulting in high landings. From 1930 to 1934 the fishing effort dropped off. This drop in effort was accompanied by a decrease in abundance. The combined effect was a precipitous drop in landings from a high of 223 million pounds in 1929 to a low of 50 million pounds in 1934."

² Graham, *op. cit.*, p. 23.

³ Agreement by the Federated Fishing Boats of New England and New York, signed 8 Dec. 1936. Reprinted at Appendix D. Under the Agreement, fishing vessels were to use only nets with a mesh larger than a designated minimum. This would allow the smaller, unmarketable haddock to escape, thus making the fishing operations more efficient and conserving the haddock stocks.

only would the traditional United States fisheries in those areas suffer, but foreign fishermen would move from those areas to Georges Bank to reap the benefits of the conservation measures imposed only upon the United States fishermen. Moreover, if only the Georges Bank haddock fishery were regulated, United States vessels could fish in the unregulated haddock fisheries on the Scotian Shelf, thus contributing to the depletion of the Scotian Shelf stocks¹. Therefore, only an international agreement among all States fishing in the Northwest Atlantic, in the United States view, could provide adequate safeguards.

11. In late 1947, a draft convention was prepared and circulated for comment within interested agencies of the United States Government and

¹ This view, which was founded upon the recognized haddock-stock division at the Northeast Channel, was expressed most clearly by the United States negotiator, Dr. Wilburt Chapman, during the ICNAF negotiations (Area 4, to which he refers, became Subarea 5 under ICNAF).

"Mr. Chapman (Chairman):

7. What gave rise to the United States' interest in this matter was the fact that we have information, satisfactory to us, that certain fish stocks on the Georgia's banks [sic] and in their vicinity are being over-fished, and that if they were not fished so hard, they actually would yield a greater catch of fish.

8. The fishery in this area is almost entirely a United States fishery at the present time. To the best of my knowledge, Canadian vessels have seldom fished in the area in recent years, and the vessels of other nations have seldom, if ever, worked in the area. I refer to Area 4 [ICNAF Subarea 5] of the chart before you.

9. Since this is an almost exclusively United States fishery at the present time, there is no reason why we could not regulate it in any manner that we thought best by control over our own citizens. This has been, and still is, being given consideration. There are, however, two reasons why such a scheme is not necessarily the best one for handling the problem.

10. The first reason is that: If, by regulating the fishing efforts of our own citizens in this particular area, we build up the fish stocks to a high level and at the same time the fish stocks in an adjacent area are being over-fished and are going downhill, then other fishermen will be drawn to the enriched banks. Now, there is no practical sense in putting money in a savings account from which everybody else in the world can draw freely, while, at the same time, you regulate closely your own withdrawals.

11. The second reason is: The imposition of regulations on United States fishermen in Area 4 would not result in the United States fishermen tying their vessels to the dock. It would simply mean that their surplus fishing efforts will be diverted elsewhere, and we know from experience that it will be diverted to Area 3 [ICNAF Subarea 4]."

International Northwest Atlantic Fisheries Conference, Washington, D.C., 26 Jan. 1949, DOC/5, Minutes of the Second Session, 27 Jan. 1949, as reproduced in I, pp. 266-268.

appropriate United States diplomatic and consular posts¹. The draft proposed the creation of an international organization with authority to establish separate regulations for "subareas" of the Northwest Atlantic Ocean. The proposed convention area and subareas generally corresponded to the Statistical Areas of the North American Council on Fishery Investigations (NACFI)². These were illustrated on a map, reproduced at Figure 1, that was attached to a February 1948, draft sent to the same government agencies and diplomatic and consular posts as the December 1947, draft convention³. By separate confidential instructions, the United States Embassy in Ottawa and the United States Consulate in St. John's, Newfoundland, were instructed to pass informally the February 1948 draft to the Governments of Canada and Newfoundland for comment⁴.

12. In June, 1948, representatives of the United States, Canada, and Newfoundland met at St. John's, Newfoundland, to discuss the proposals of the United States⁵. Changes requested by the Canadians at that meeting were then incorporated into a new draft that was circulated to concerned governments in October, 1948⁶. One central Canadian con-

¹ See the United States Secretary of State's Instructions to Certain American Diplomatic and Consular Officers, dated 31 Dec. 1947, with draft convention attached. *Reprinted at Appendix E*. The Note was sent to United States Diplomatic Posts in Canada, Denmark, France, Ireland, Italy, Newfoundland, Norway, Portugal, and the United Kingdom. At the time, the draft treaty was not circulated to foreign governments.

(24) ² See United States Memorial, Figure 8. The United States originally proposed that the convention area be divided into four subareas. At the request of Denmark, Subarea 1 was divided into two Subareas (SA 1 and 2), and Subareas 2, 3, and 4 were renumbered 3, 4, and 5, respectively. During the early stages of the 1949 negotiating conference and in the prior correspondence, what became ICNAF Subarea 5, the Georges Bank-New England area, was referred to as Subarea 4.

³ See the United States Secretary of State's Instructions to Certain American Diplomatic and Consular Officers, dated 26 Mar. 1948. *Reprinted at Appendix F*.
(107) Figure 1 is also reproduced, with a different caption, at Figure 19 of the United States Counter-Memorial.

⁴ See the United States Secretary of State's Confidential Instructions to the American Consular Officer in Charge, Ottawa, Canada, and St. Johns, Newfoundland, dated 10 March 1948. *Reprinted at Appendix G*.

⁵ The report of the American Consul-General in St. John's, Newfoundland, of the 14-16 June 1948 meeting, dated 21 Jun. 1948, notes that one of the points considered at the meeting was how to secure regulation of Georges Bank (referred to in that report as Subarea 4), without the entry into force of regulations for the entire area. *Reprinted at Appendix H*. During and prior to this time, Canada had no significant fishery anywhere off the United States coast, including Georges Bank.

⁶ Letter from Mr. W. Flory, United States Dept. of State, to Dr. S. Bates, Deputy Minister of Fisheries of Canada, which included the October, 1948, draft convention. *Reprinted at Appendix I*.

cern was the possibility that Canadian fishermen would be regulated under the proposed convention. Canada did not believe that there was any need to regulate the fisheries in which its fishermen participated. In 1949, Canada indicated that it would consider a convention that provided for the regulation of what was to become Subarea 5, but that it did not wish to provide for regulation of other areas¹. The reason for Canada's position seems clear. It was willing to accept regulation of the Georges Bank area, because Canadian vessels did not fish there.

13. In January, 1949, delegates from those States fishing in the Northwest Atlantic Ocean gathered in Washington, D.C., to discuss the formation of an international organization with research and regulatory responsibilities for the fisheries of the region². Many of the delegates, particularly those of Canada, expressed their reluctance to create an international body with authority to regulate high-seas fisheries³. The United States, however, convinced the other States that, although immediate regulation of fishing in all parts of the Northwest Atlantic was not necessary, the anticipated increase of distant-water fleets fishing in the Northwest Atlantic eventually would make regulation necessary⁴. The result of the conference was the International Convention for the Northwest Atlantic Fisheries.

¹ See Note No. 22 from the Canadian Secretary of State for External Affairs to the Embassy of the United States, dated 19 Jan. 1949. *Reprinted at Appendix J.*

² The States attending included: Canada, Denmark, France, Iceland, Italy, Norway, Portugal, Spain, the United Kingdom, and the United States. Newfoundland was also represented.

³ ICNAF, Minutes of the Third Session, DOC/16, 27 Jan. 1949. *Reprinted at Appendix R.*

⁴ ICNAF, *supra* p. 1, n. 1, at Preamble and Art. VIII, pp. 9 and 15.

CHAPTER II

THE LEGAL STRUCTURE OF ICNAF

14. The International Convention for the Northwest Atlantic Fisheries was opened for signature on 8 February 1949 and entered into force on 3 July 1950. It established a Commission with authority to conduct scientific research and to regulate fisheries in the area covered by the Convention, and five Panels of limited membership with authority to regulate the fisheries in separate "subareas" of the Convention Area. This Chapter describes briefly the ICNAF institutions and procedures.

SECTION 1. The Convention Area

15. The Convention applied to the Northwest Atlantic Ocean west of the 42nd meridian and north of the 39th parallel, excluding the area around Baffin Island, Canada, and excluding the territorial seas of the Contracting Parties¹. Figure 2.

SECTION 2. The Subareas

16. The Convention Area was divided into five "subareas." The Subareas generally coincided with the Statistical Areas established by NACFI². Thus, ICNAF recognized, as NACFI had earlier, that the Northeast Channel was a natural boundary between fish stocks and fishing grounds, and used it to delimit regulatory areas. The Commission subsequently established Statistical Area O around Baffin Island and Statistical Area 6, from New York to North Carolina. Figure 3. Although these Statistical Areas were outside the Convention Area, they were often subject to the regulatory measures established for Subareas 1 and 5, respectively.

SECTION 3. The Commission

17. The Commission was ICNAF's plenary body. Its responsibilities for scientific research included recommending and conducting research, collecting statistics, and publishing reports³. Its primary responsibility

¹ ICNAF, *supra* p. 1, n. 1, Art. I and the Annex to the Convention.

(24) ² See United States Memorial, para. 76 and Figure 8. Some slight modifications were made to the NACFI Statistical Areas. For example, NACFI divided the Bay of Fundy between two statistical areas, while ICNAF included the entire Bay of Fundy within Subarea 4. At the request of Canada, the United States incorporated this change into its draft convention, following a meeting between representatives of the United States, Canada, and Newfoundland at St. John's, Newfoundland, in June, 1948. See para. 12 above. This draft was circulated to interested governments in October, 1948. The draft convention of October, 1948, is *reprinted at Appendix I*.

³ ICNAF, *supra* p. 1, n. 1, at Art. VI.

was to oversee and to coordinate the regulatory work of the Panels¹. Each Contracting Party could cast one vote in Commission decisions; affirmative decisions required a two-thirds majority².

SECTION 4. The Panels

18. The Convention established five Panels of limited membership. Each Panel was responsible for making recommendations to the Commission for scientific research and for regulations in a particular Subarea³. Each Panel was assigned the same number as the Subarea it regulated.

19. The original membership of the Panels was recorded in the Annex to the Convention. Canada (or Newfoundland) was an original member of Panels 2, 3, 4, and 5. The United States was an original member of Panels 4 and 5. Under Article IV of the Convention, membership could be altered each year after the Convention had been in force for two years, based upon a "current substantial exploitation of stocks in the subarea", although States with coastlines adjacent to a Subarea retained Panel membership regardless of their level of activity⁴. When the first review of

¹ ICNAF, *supra* p. 1, n. 1, at Art. VIII.

² *Ibid.*

³ *Ibid.*, at Arts. IV and VI.

⁴ The Canadian Memorial, at para. 190, implies mistakenly that original Panel membership was based on the Article IV criteria. Such was not the case, as noted by Mr. Gushue, the Newfoundland delegate to the Negotiating Conference:

"222. MR. Gushue (Newfoundland): Mr. Chairman, the point that occurs to me is this. After a period of three years (under Article IV, paragraph 6,) the Panel representation is to be reviewed annually on the basis of current substantial exploitation. If that were applied originally or if there were some reference in the early part of Article IV to the basis for representation on Panels, it might clear the matter, but I do see the possibility that on certain Panels you would have several countries who have no history of fishing or who are not currently fishing, who would have nothing to add by way of information, or statistics, or knowledge to the work of the Panel.

223. If you look particularly at Sub-area 2 [ICNAF Subarea 3], it is a very good example. In Sub-area 2 at the moment and for a considerable number of years to speak conservatively, there has been only one country fishing. That has been Newfoundland. You have mentioned three other countries, none of whom to my knowledge have any record of fishing there, and you would have a Panel with a majority of members sitting who had no active interest in the area. That is the point which seems to me to be a fairly substantial one. That is why I would like to see from the beginning some screening of claims for representation on the basis of exploitation of the area, since it is provided after three years automatically."

International Northwest Atlantic Fisheries Conference, DOC/47, Minutes of the Fifteenth Session, 5 Feb. 1949. *Reprinted at* Appendix K. Notwithstanding Mr. Gushue's appeal, no such screening occurred. Canada therefore is mistaken when it implies that its original membership in Panel 5, as proposed by the United States, acknowledges some special Canadian interest comparable to that set out in Article IV. There is no such connection.

Panel membership took place at the 1952 Annual Meeting, the United States requested and was granted membership in Panel 3, based upon its level of fishing in Subarea 3¹.

SECTION 5. The Adoption of Regulations

20. Each Panel made recommendations to the Commission for regulatory measures in its Subarea. The Commission either could transmit a recommendation as a proposal to the United States, as Depositary Government, or it could return the recommendation to the Panel for reconsideration². The United States was required to transmit any proposal that it received to all Contracting Parties for their consideration, and was entitled to "make such suggestions as will facilitate acceptance of the proposal"³. If the Commission returned the recommendation to the Panel, and the Panel affirmed its previous decision, the Commission was then required to transmit it to the United States Government⁴. A proposed regulation became effective after receipt by the United States of the acceptances of all Contracting Parties that were members of the Panel for the affected Subarea⁵. Although each Panel had the final authority to propose regulatory measures for its own Subarea, the Commission did have authority, after consulting with all the Panels, to adopt and to transmit directly to the United States Government any regulatory measures affecting the Convention Area as a whole⁶.

21. Once a regulation entered into force for a Subarea, it bound all Contracting Parties and not the Panel members alone. After a regulation had been in force for one year, a member of the Panel for the Subarea affected by the regulation was entitled to give notice of termination. The regulation would cease to be binding upon that Panel member one year later. Thereafter, any other Contracting Party was entitled to give notice of termination, effective immediately, for the same regulation⁷.

¹ ICNAF *Second Annual Report*, 1951-1952, p. 11.

² ICNAF, *supra* p. 1, n. 1, at Art. VIII(2).

³ *Ibid.*, at Art. VIII(6).

⁴ *Ibid.*, at Art. VIII(4).

⁵ *Ibid.*, at Art. VIII(8), Appendix 1, pp. 15-16. This was later amended by the Protocol Relating to the Entry into Force of Proposals Adopted by the Commission. 21 U.S.T. 567, T.I.A.S. 6840. *Reprinted at* Appendix A, pp. 35-38.

⁶ *Ibid.*, at Art. VIII(5).

⁷ *Ibid.*, at Art. VIII (9).

SECTION 6. Specialized Standing Committees

22. The Commission established specialized committees, several of which became permanent standing committees, to deal with matters beyond the authority of individual Panels. There were standing committees on finance and administration, research and statistics, regulatory measures, and enforcement¹.

¹ ICNAF documents often refer to the standing committees by their acronyms. STACRES was the Standing Committee on Research and Statistics. STACFAD was the Standing Committee on Finance and Administration. STACTIC, the Standing Committee on International Control, dealt with enforcement issues and the Joint International Enforcement Scheme, discussed below at pp. 23-27, paras. 35-44. STACREM, the Standing Committee on Regulatory Measures, was established in the late 1960s to review the administrative and economic aspects of the various regulatory measures recommended to the Commission, and to develop a workable system for the implementation of national quota regulation. A collection of ICNAF Publications has been deposited pursuant to Rule 50(2) of the Rules of Court.

CHAPTER III

THE ACTIONS AND PROPOSALS OF THE UNITED STATES WITHIN THE COMMISSION CONFIRM THE UNITED STATES LEADERSHIP ROLE IN SEEKING TO MAKE ICNAF EFFECTIVE

23. After the Convention entered into force, and particularly after distant-water fleets began fishing on Georges Bank in the 1960s, the United States devoted substantial diplomatic and scientific efforts to make ICNAF effective. Most of the major ICNAF improvements and innovations originated with the United States. This chapter describes only certain of the many United States initiatives.

SECTION 1. The United States took Action to Ensure the Timely Adoption of Regulations and Amendments to the Convention

24. Several procedural obstacles often prevented ICNAF from acting in timely fashion. One such problem was the long delay on the part of Contracting Parties in implementing regulations¹. Under the Convention, regulations did not become binding until all Panel members gave notice of acceptance. Action by some member States on some proposals was so slow that proposed amendments to the regulations occasionally were adopted before the original regulations had entered into force². In 1964, the United States proposed a Protocol to the Convention to expedite the entry into force of regulatory measures³. The Protocol was adopted by the Commission in that year and entered into force on 19 December 1969⁴. It changed the system of "positive consent" to one of "implied consent": regulations became binding if there were no objections from Panel members within six months of the date of notification.

25. Although the implied-consent system did speed the entry into force of regulations, in many cases the six-month objection period had not elapsed, and the annual management measures had not entered into force, until after the beginning of the fishing year in which the regulations were to apply. The problem arose for two reasons: first, for political reasons, agreement often could not be reached sufficiently in advance of the fishing year; and, second, for some species, current catch data often were not available at the Annual Meeting, convened each June, to establish

¹ *ICNAF Proceedings*, 1964, Doc. 7, Item 2.

² *Ibid.*, 1964, Doc. 18, App. III.

³ *Ibid.*, 1964, Doc. 18, App. IV.

⁴ Protocol Relating to Entry into Force of Proposals Adopted by the Commission. 21 U.S.T. 567, T.I.A.S. 6840. *Reprinted at Appendix A.*

quotas for the following year. The problem became acute in the 1970s, when many of the stocks were subject to annual quotas. Therefore, the United States proposed an interpretation of the Convention and the Commission procedures whereby Panel members at the 1973 Annual Meeting adopted regulations setting limits within which the Commission could establish catch quotas¹. These regulations were forwarded to the Panel Members for their review and became effective in six months, provided there were no objections. When the data necessary to set quotas were later submitted, the Commission established quotas within the limits set by the regulations. The quotas became effective immediately, without the need for an additional six-month objection period.

26. Troublesome delays also stemmed from the fact that the original Convention did not provide a procedure for its amendment. An amendment to the Convention required the ratification, acceptance, or accession of all Contracting Parties. This became a significant impediment in the late 1960s, when the United States sought to implement new types of regulatory measures, which were not authorized by the Convention, to deal with the growing conservation and management problems in the Convention Area. Thus, in 1970, the Commission adopted a United States proposal that provided for an expedited amendment procedure². This entered into force, on 4 September 1974, as a protocol to the Convention³.

SECTION 2. The United States Proposed Catch-Quota Systems to Protect the Fisheries of Georges Bank

27. Although the Convention authorized the establishment of limits on overall catch, such measures were widely opposed until the late 1960s. At the 1965 meeting of Panel 5, the United States noted that the haddock stock on Georges Bank was being exploited well beyond its maximum sustainable yield, and it suggested consideration of additional conservation measures, including the imposition of quotas on the catch⁴. The Panel rejected the suggestion. At the 1966 Annual Meeting of the Commission, after another distressing report on the effects of overfishing in Subarea 5⁵, the United States again recommended catch quotas. Once

¹ *ICNAF Proceedings*, 1973 (Special Meeting, Jan. 1973), Doc. 3, Item 5. The United States made this proposal in the context of national quotas for herring for the fishing year 1974. The United States proposal was adopted at the 1973 Annual Meeting. *ICNAF Proceedings*, 1973, Doc. 16, App. III. Canada made a similar proposal for stocks of herring in Divisions 4X and 4W. *ICNAF Proceedings*, 1973, Doc. 16, App. II.

² *ICNAF Proceedings*, 1970, Doc. 10.

³ Protocol Relating to Amendments to the Convention. 25 U.S.T. 2716, T.I.A.S. 7941. Reprinted at Appendix A, pp. 43-46.

⁴ *ICNAF Proceedings*, 1965, Doc. 6, App. I.

⁵ *ICNAF Proceedings*, 1966, Doc. 8, App. I.

again, no action was taken¹. At the 1967 Annual Meeting, the United States proposed a system of global catch quotas (a limit on the combined catch of all States) for each stock in each Subarea². The proposal for global catch quotas was referred for study to a special committee on fisheries management. At a joint meeting of Panels 4 and 5 held in 1969, Panel 5, under strong pressure from the United States, adopted a United States proposal to limit the total haddock catch in Subarea 5³. At that meeting, Panel 4 adopted a similar proposal of Canada regarding haddock in Subarea 4. These were the first quota regulations adopted by ICNAF.

28. In 1968, the United States proposed a system of national catch quotas (separate limits on the catch of each State) for each stock in each Subarea⁴. Inasmuch as the Convention did not then authorize national catch quotas, the United States also proposed an amendment to the Convention that would greatly expand the regulatory authority of the Commission⁵. The Protocol Relating to Panel Membership and Regulatory Measures was adopted, and entered into force in 1971⁶. Thereafter, the United States and Canada worked within Panels 4 and 5 to establish both global catch quotas and national catch quotas for stocks in Subareas 4 and 5.

29. It soon became evident that, due to the unique character of the Georges Bank fishery, the quota system was not adequate to protect the stocks in Subarea 5⁷. On Georges Bank, the various species intermingle to a degree not found elsewhere. It is impossible to fish for one species (primarily of groundfish) without catching other species. For example, a vessel trawling for cod will also catch haddock, hake, and other fish. Under the national quota system, each State received a separate annual quota for each stock of fish. When a State had caught its entire quota of a stock, it was required to terminate its directed fishery for that stock. It could continue to fish for other stocks, however, and, as it did so, to take incidental catches ("by-catches") of the stock for which the quota had

¹ *ICNAF Proceedings*, 1966, Doc. 11.

² *ICNAF Proceedings*, 1967, Doc. 9, Item 11.

³ *ICNAF Annual Proceedings*, 1968-1969, pp. 26-27.

⁴ *ICNAF Proceedings*, 1968, Doc. 18, Ann. I

⁵ The Convention limited the regulatory measures available to the Commission to the following: closed fishing seasons, closed fishing areas to protect spawning, size limits for particular species, gear restrictions, and overall catch quotas. Art. VIII (1).

⁶ Protocol Relating to Panel Membership and Regulatory Measures. 23 U.S.T. 1504, T.I.A.S. 7432. Reprinted at Appendix A, pp. 39-42. The Protocol combined a United States proposal on regulatory measures with a Canadian proposal on Panel membership.

⁷ *ICNAF Proceedings*, 1973 (Special Meeting, Jan. 1973), Doc. 4, Item 3 (Statement by the United States delegate).

been reached and the fishery closed. As a result, the sum of the catch of the directed fishery and incidental catch of a stock could exceed the total allowable catch for a stock.

30. Therefore, at the Special Commission meeting in January, 1973, the United States proposed for Subarea 5 another type of control -- a comprehensive limit on overall fishing effort, as measured by vessel size and the number of vessel-days on the fishing grounds¹. This proposal was rejected. The United States continued to seek a reduction in overall fishing effort. At the Annual Meeting in June, 1973, the United States proposed an alternate means of limiting the fishing effort in Subarea 5 and Statistical Area 6: the "two-tier" quota system². This was adopted at a Special Commission meeting in October, 1973³.

31. Under the two-tier quota system, each State first received (1) a national (first-tier) quota for each stock of fish and (2) a quota (second-tier) that limited its total catch of all species. The second-tier quota was always less than the sum of the quotas for the individual stocks⁴. Once a State exhausted its first-tier quota for a particular stock, it was required to close its directed fishery for that stock; when its total catch reached the second-tier quota, it had to terminate fishing, regardless of whether the national quotas for the individual stocks had been reached.

32. The innovative two-tier approach forced total catches downward, and induced the Contracting Parties to concentrate their fishing operations on the most desired species, avoiding by-catches to the extent possible. This United States initiative was the single most important step taken by ICNAF to reduce overfishing on Georges Bank and throughout Subarea 5 and Statistical Area 6⁵.

SECTION 3. A Protocol Proposed By the United States Provided for A More Flexible Conservation and Management Standard

33. The 1969 Protocol Relating to Panel Membership and Regulatory Measures also established new conservation and management standards.

¹ *ICNAF Proceedings*, 1973, Doc. 4, App. I.

² *Ibid.*, 1973, Doc. II, Items 7, 8, II, 21, 24, and App. IV.

³ *ICNAF Proceedings*, 1974 (Special Meeting, Oct. 1973), Doc. 3, Item 18, and App. I.

⁴ For instance, in 1974, the national allocation for individual stocks in Subarea 5 and Statistical Area 6 totaled 1,121,000 metric tons. The second-tier quotas totaled only 923,900 metric tons.

⁵ Canada accepted the need for the two-tier quota system in Subarea 5, but believed that such a system was not appropriate for the different biological conditions existing in Subarea 4. *ICNAF Proceedings*, 1974, p. 31 (Special Meeting, Oct. 1973), "Canadian proposal for quota regulation in Subareas 2 to 4 to be considered at January 1974 Meeting of Commission", Serial No. 3132 (A.a.4), Proceedings No. 6, App. I. *Reprinted at Appendix L.*

The Protocol, which was proposed by the United States, substituted "optimum utilization" for "maximum sustained catch" as the basic criterion for regulatory measures, and added "economic and technical considerations" to the "scientific investigations" that were the basis for those regulations¹.

34. The Convention's original term "maximum sustained catch", or "maximum sustainable yield", as it is most commonly phrased, was intended to provide a readily determinable scientific basis for fisheries conservation measures, i.e., the maximum amount of fish that could be harvested from a stock on a continuing basis year after year. The concept created difficulties in practice, however. Maximum sustainable yield excluded important considerations, such as the effect of regulations on the coastal-State fishing industries. Moreover, States objected to regulations on the grounds that scientific data were inadequate to determine maximum sustainable yield. The concept of optimum utilization, developed by the United States, allowed ICNAF to take into account various national priorities, including relevant social and economic factors. Because management measures were no longer based exclusively on scientific conclusions, States were less able to object to management measures on the narrow grounds of inadequate scientific data. The optimum-utilization concept has since found an important place in United States domestic fishery law² and in the Convention adopted by the Third United Nations Conference on the Law of the Sea³.

SECTION 4. The United States Took the Initiative to Develop an Effective International Enforcement Program.

35. Widespread violations of ICNAF conservation measures were an important reason underlying ICNAF's failure to protect the fishery resources. In response, the United States led the effort to develop, and continually sought to strengthen a system for enforcing ICNAF regulatory measures. The need for effective international enforcement became urgent when large-scale foreign fishing began in Subarea 5 in the early 1960s. One problem was that, except for the Canadian vessels, the newly arrived fleets were so far from their home ports that it was difficult for their own authorities to carry out active enforcement operations. Moreover, States were reluctant to disadvantage their own vessels by enforcing regulations that were ignored by their competition.

¹ Protocol Relating to Panel Membership and Regulatory Measures, *supra* p. 21, n. 6, at Arts. II and III.

² Fishery Conservation and Management Act of 1976, 16 U.S.C. secs. 1800, 1851(a)(1). United States Memorial, Annex 8, Vol. I.

³ United Nations Convention on the Law of the Sea, opened for signature 10 Dec., 1982, U.N. Doc. A/CONF. 62/122, at Art. 62.

36. One possible solution was to allow inspection of fishing vessels by States other than the flag State. The Convention originally did not authorize such a program. The Commission therefore adopted in 1963 a proposal to amend the Convention so as to authorize the Commission to:

“... make proposals for national and international measures of control on the high seas for the purposes of ensuring the application of the Convention and the measures in force thereunder”.

The Protocol Relating to Measures of Control entered into force on 19 December 1969².

37. At about this same time, in 1964, the Northeast Atlantic Fisheries Commission (NEAFC) began to develop an international enforcement program for the Northeast Atlantic Ocean. The United States realized that, because most of the Parties to ICNAF were also Parties to NEAFC, the NEAFC enforcement program would have an influence upon what would be acceptable in ICNAF. Therefore, ICNAF proposed to NEAFC that non-members of NEAFC be permitted to work with the NEAFC Committee that was developing an international enforcement program. NEAFC accepted this idea, and the United States and Canada participated actively in the work of the NEAFC Committee entrusted with the development of that program³.

38. In 1967, after NEAFC adopted its enforcement program, the United States proposed the establishment of an *ad hoc* committee to review the NEAFC program in the light of ICNAF's needs⁴. The *ad hoc* Committee on Trawl Regulation undertook consideration of the NEAFC plan in 1967⁵. The principal debate in the Committee was between the United States and the Soviet Union. The Soviet Union wanted to prevent broader international enforcement authority than that existing under the NEAFC plan, while the United States sought stricter controls⁶. The Committee produced a draft plan in 1968, and the United States pressed for its adoption at the 1970 Annual Meeting. Despite reservations by

¹ ICNAF Proceedings, 1963, Doc. 17, Item 3.

² 21 U.S.T. 576, T.I.A.S. 6841. Reprinted at Appendix A, pp. 33-34.

³ ICNAF Proceedings, 1965, Doc. 15, Item 3.

⁴ ICNAF Proceedings, 1967, Doc. 9, Item 10, and Doc. 23, Item 5.

⁵ The NEAFC enforcement program provided for the boarding of vessels of member States by enforcement officials of any member State, for inspection of the nets on deck, and for reports of infringements to the flag State of the vessel inspected. Below-deck inspections, i.e., of the catch, were not authorized under the original NEAFC program.

⁶ ICNAF Proceedings, 1968, Doc. 19 and App. I. For example, the United States sought authority for enforcement officials to inspect areas below the main deck.

Soviet-bloc States regarding inspection below decks¹, the Commission adopted the Joint International Enforcement Scheme at the 1970 meeting.

39. As originally adopted, the Joint International Enforcement Scheme authorized designated enforcement officials of Contracting Parties to board fishing vessels of other Contracting Parties, and to inspect gear, catch, and logs of the vessels in order to ascertain whether they were in compliance with ICNAF regulations. The inspectors completed standard report forms, which were forwarded to the Commission and to the flag State of the vessel involved².

40. Thereafter, the United States continued to work for improvements in the inspection program. In 1973, the United States proposed to allow inspectors to detain a vessel found to have committed a significant violation of the regulations, in order to foreclose continuing violations and to preserve evidence, until the appropriate authorities of the flag State accepted responsibility for the vessel³. The distant-water fishing States argued that this proposal would violate the principle of exclusive flag-State jurisdiction over fishing vessels beyond the territorial sea. The detention proposal was rejected. The Commission did adopt, however, other improvements to the inspection program proposed by the United States, including a requirement that each flag State report the actions taken against violators under domestic law⁴.

41. At the Annual Meeting in June, 1974, ICNAF adopted a modified United States-Canadian proposal that authorized an inspector, with the permission of the flag State, to remain aboard an offending vessel until the appropriate disposition of the case was made⁵. The inspector could also remove, or tag and seal, portions of a net or other fishing gear being used in violation of the Commission's regulations. This proved to be inadequate, however, as detention of a vessel required the permission of a flag-State inspector, which often could not be obtained.

¹ *ICNAF Proceedings*, 1970, Doc. 8, and Doc. 15, App. II. The Soviet Union, Poland, and Romania maintained reservations, and inspection below decks of their vessels was not permitted until 1974, when the reservations were withdrawn.

² *Ibid.*, 1970, Doc. 15 and App. I.

³ *ICNAF Proceedings*, 1973 (Annual Meeting), Doc. 4, Item 4 (g)(ii), and App. I, 5(ii).

⁴ *Ibid.*, 1973 (Annual Meeting), Doc. 4, Item 4(e). The United States made this proposal because its fishermen, who were forced to comply with ICNAF regulations, complained that the foreign fleets were not so constrained, as flag States were not taking action against their fisherman who were found committing violations.

⁵ *ICNAF Proceedings*, 1974, Doc. 4, pp. 121-130.

42. As a result, the United States, in 1975, again proposed to allow vessels that committed significant violations of the Commission's regulations to be detained until the arrival of flag-State authorities. The Commission discussed the proposal at the Special Meetings held in September, 1975, and in January, 1976, but took no action¹. Consideration of that proposal, however, accelerated the adoption of a requirement that each flag State having more than 15 vessels fishing in the Convention Area must have an inspector present and able to receive, and to respond to, reports of violations by its vessels². In addition, the Commission adopted a United States proposal authorizing an inspector to order a vessel found to have committed a significant violation to cease fishing until authorities of the flag State could be contacted³.

43. Apart from the inspection and detention plan, the Commission also adopted other United States proposals to improve enforcement powers. These included a system of registration for vessels fishing in the Convention Area⁴, a requirement that vessels fishing in Subareas 4 and 5 and in Statistical Area 6 carry Commission observers who would report on vessel compliance with ICNAF regulations⁵, a requirement that vessels fishing in the Convention Area maintain catch log books⁶, and the publication of a simplified guide to the increasingly complex ICNAF regulations⁷.

44. The United States, throughout ICNAF's history, continued to propose improvements to ICNAF's enforcement program, and some of these proposals proved successful in part. Nevertheless, ICNAF failed to implement an effective enforcement program. As late as January, 1976, the United States communicated, by diplomatic note, the following statement to the other ICNAF members:

"For several years the United States has encouraged wider participation in the Scheme of Joint Enforcement. Inspectors names are provided to member governments, but in fact, there is no evidence that actual participation in the form of full-scale at-sea inspection has increased. Violations remain undetected by

¹ *ICNAF Proceedings*, 1976 (Special Meeting, Jan. 1976), Doc. 2, Item 8.

² *ICNAF Annual Proceedings*, Vol. 26, p. 85. *ICNAF Proceedings*, 1976 (Special Meeting, Jan. 1976), Doc. 2, Item 24.

³ *ICNAF Proceedings*, 1976, Doc. 2, Item 24(b). See pp. 79-87 for a summary of the discussion by STACTIC on the United States-proposed amendments to the Joint International Enforcement Scheme.

⁴ *ICNAF Proceedings*, 1976 (Special Meeting on Enforcement), App. II, Item 8, and Ann. F.

⁵ *ICNAF Proceedings*, 1976 (Annual Meeting), Doc. 4, Item 19, and App. I, Item 4.

⁶ *ICNAF Proceedings*, 1970, Doc. 13, Item 5.

⁷ *ICNAF Proceedings*, 1967, Doc. 15, Item 8, Doc. 17, Item 3, and App. I.

countries that send their vessels to fish in the Convention Area. It appears clear to U.S. officials that most Member Nations have no effective direct control over their vessels from the time they leave port until the time they return. The result of this negligence has been an epidemic of infringements.

Over the past four years data on incidents reported to U.S. officials show that on numerous occasions Member Nations have allowed their fleets to continue fishing far beyond the data [sic] when their allotted quota for a species had been caught.

The overwhelming impression arises that many individual captains and in some cases entire fleets are being poorly advised of their responsibilities to ICNAF, or if correctly advised they are not being managed properly to assure proper adherence. Individual fishing captains, because they are not threatened with immediate prosecution and loss of right to fish, take risks and violate, knowing that eventual punishment, if any, will be offset by the full cargo of fish brought home. This lax attitude on the part of the captains, and their apparent scoffing at regulations, exist because Member Nations have not participated sincerely and fully in the Scheme of Joint Enforcement ¹."

The United States note then proposed further improvements in the Joint International Enforcement Scheme, including an "overquota penalty" that would cause a State's quota allocation to be reduced by 250 per cent of the amount of any fish taken in excess of a quota. These proposals were never adopted. The statement, however, illustrates both the continual United States efforts to improve the enforcement of ICNAF regulations and the sense of frustration that led the United States ultimately to extend its exclusive fishery-management jurisdiction to a distance of 200 nautical miles.

¹ See Note from United States ICNAF Commissioners to Member Countries on Strengthening and Improving the Scheme of Joint International Enforcement, ICNAF, Commissioners Document 76/2. *Reprinted at Appendix M.*

CHAPTER IV

SPECIFIC MANAGEMENT MEASURES ADOPTED BY THE COMMISSION CONFIRM UNITED STATES LEADERSHIP IN PANEL 5, REFLECTING THE PREDOMINANT INTEREST OF THE UNITED STATES IN GEORGES BANK, AND CANADIAN LEADERSHIP IN PANEL 4

45. The United States and Canada were original members of both Panels 4 and 5. The pattern of activities of the two States within those Panels reflects their respective interests in those Subareas. The United States was responsible for proposing essentially all of the conservation and management measures in Panel 5. Canada, in turn, was responsible for proposing most of the conservation and management measures in Panel 4. Within Panel 5, the United States consistently pressed for stronger regulatory measures for Subarea 5. In fact, Subarea 5 was ICNAF's "testing ground" for regulatory measures. Often, after a United States proposal had proven effective in Subarea 5, Canada would submit an identical proposal for a regulation in Subarea 4. Canada was generally supportive of the United States proposals for Subarea 5, and the United States was generally supportive of the Canadian proposals for Subarea 4.

46. Tables B1-B25, beginning at page 47, summarize the research and management activities of the United States and of Canada with respect to Subareas 4 and 5. They demonstrate, on a year-to-year basis, that the United States assumed the lead in conservation and management proposals in Subarea 5, while Canada assumed the lead regarding Subarea 4.

SECTION 1. The United States Proposed Net-Mesh Regulations For Subarea 5

47. The need to regulate the Georges Bank haddock fishery had been the principle reason that the United States sought the establishment of ICNAF. At the first Annual Meeting in 1951, the United States proposed a minimum mesh-size regulation for haddock fishing on Georges Bank¹. This proposal was adopted at the 1952 Annual Meeting² and proved effective in Subarea 5. In 1955, the United States proposed, and the Panel agreed, to extend the net-mesh regulations to cod in Subarea 5, and to

¹ ICNAF, Report of the First Annual Meeting, 2-10 Apr. 1951, p. 7.

² ICNAF, Report of the Meeting of Panel 5, 26-27 Feb. 1952. *Reprinted at* Appendix N.

regulate the incidental catch of cod and haddock by vessels fishing for other species¹. In that same year, Panel 4, acting upon a Canadian proposal, established for the first time cod and haddock net-mesh regulations in Subarea 4².

48. In 1956, the United States proposed a modification to the rules governing the incidental catch of cod and haddock³. The proposal would have allowed vessels fishing for unregulated stocks of fish in Subareas 4 and 5 to use smaller-size net meshes, provided that no more than 10 per cent of their total annual catch was comprised of the regulated species, cod and haddock. "Canada was reluctant to adopt this form of exemption but could accept [it] as an experiment in Subarea 5 ...". This experimental program proved successful in Subarea 5, and was later implemented in Subareas 3 and 4, based upon Canadian proposals⁴.

SECTION 2. The United States Proposed the Adoption of Stronger Conservation Measures For Subarea 5 Beginning in the Mid-1960s

49. Mesh-size regulation was the primary conservation tool used by Panels 4 and 5 from 1950 to the mid-1960s. Once the large distant-water fleets entered these fisheries, other regulatory measures were required to protect the stocks. As discussed above, the United States proposed both global and national catch quotas. The United States, in regard to Subarea 5, and Canada, in regard to Subarea 4, also sponsored other measures.

50. In 1969, the United States proposed that portions of Georges Bank be closed to fishing during the haddock spawning season⁵, and that a global quota be established for haddock in Subarea 5⁶. Canada proposed a similar quota for haddock catches in Subarea 4⁷. The haddock quotas were referred to a joint meeting of Panels 4 and 5 for further consideration. That meeting adopted the United States proposal for Subarea 5 and the Canadian proposal for Subarea 4⁸. These were the first catch limits for any ICNAF stocks.

51. In 1970, Panel 5 accepted United States proposals to reduce the haddock quota, to extend the closed-area regulations by one month, and to

¹ *ICNAF Annual Proceedings*, 1955, pp. 11-13.

² *Ibid.*, p. 13.

³ *ICNAF Annual Proceedings*, 1956, p. 15.

⁴ *ICNAF Proceedings*, 1965, Doc. 13, Item 3(b).

⁵ *ICNAF Proceedings*, 1969, Doc. 16, App. I, II.

⁶ *Ibid.*, 1969, Doc. 16, App. II.

⁷ *Ibid.*, 1969, Doc. 16, App. III.

⁸ *Ibid.*, 1969, Doc. 16. See discussion of United States catch-quota proposals for Georges Bank stocks, pp. 20-22, paras. 27-32.

extend the mesh-size and quota regulations to yellowtail flounder¹. Panel 4 adopted similar regulations, proposed by Canada, for haddock in Subarea 4².

52. In 1971, Panel 5 adopted United States proposals to increase the mesh size and to decrease the quota for yellowtail flounder in Subarea 5³. The United States also proposed a prohibition on haddock fishing, except for incidental catches, in Subarea 5⁴. This proposal was modified in a joint meeting of Panels 4 and 5 to limit the directed fishery for haddock in Subarea 5 to 6000 metric tons⁵. The joint meeting also adopted similar regulations proposed by Canada for haddock fishing in Subarea 4⁶.

53. By 1972, the New England fishing industry was faced nearly with extinction. Total catches of ICNAF stocks had fallen precipitously, and total United States catches had fallen below traditional levels. ICNAF industry advisors from the United States formally recommended that the United States withdraw from ICNAF; bills were introduced in Congress to extend United States exclusive fishery-management authority. Faced with the threat of United States withdrawal, ICNAF adopted an unprecedented 23 regulatory proposals at its 1972 Annual Meeting, including fifteen national quota allocations. The United States proposed most of the measures for Subareas 5, and Canada proposed most of the measures for Subarea 4.

54. The principal regulatory proposal adopted by ICNAF in 1973 was the two-tier quota system for Subarea 5, discussed above at paragraphs 29 through 32. This was adopted only after extraordinary pressure by the United States. At the Annual Meeting in June, 1973, the United States refused to agree to any other regulatory proposals unless the two-tier system was also adopted. The meeting resulted in an impasse, and raised the prospect of the total breakdown of the ICNAF system. Consequently, in October, 1973, ICNAF convened an unprecedented third meeting within a single year. At that meeting, Panel 5 adopted the two-tier quota system, as well as second-tier quotas proposed by the United States, for the 1974 and 1975 fishing seasons in Subarea 5 and Statistical Area 6⁷. ICNAF also adopted United States proposals for quotas on cod, haddock, herring, red hake, silver hake, flounder, yellowtail flounder, and mackerel

¹ *ICNAF Proceedings*, 1970, Doc. 5, Items 7, 8, and Apps. III, IV.

² *Ibid.*, 1970, Doc. 6, Item 6.

³ *ICNAF Proceedings*, 1971, Doc. 6, App. II, III.

⁴ *Ibid.*, Doc. 6, Item 7.

⁵ *Ibid.*, Doc. 13, App. I.

⁶ *Ibid.*, Doc. 13, App. II.

⁷ *ICNAF Proceedings*, 1979 (Special Meeting, Oct. 1973), Doc. 3, and App. I.

in Subarea 5, and Canadian proposals for quotas on haddock, redfish, hake, and yellowtail flounder in Subarea 4, and pollock in Subarea 4 and 5¹.

55. In 1974, the United States proposed to close the Georges Bank groundfish fishery for all of 1975, in order to protect the important haddock stock in Subarea 5². As a compromise, Panel 5 adopted a strict by-catch quota for haddock³. Canada proposed several regulations for stocks in Subarea 4⁴.

56. At the insistence of the United States, Panel 5, in 1975, reduced the second-tier quota from 850,000 metric tons for 1975 to 650,000 metric tons for the 1976 fishing year⁵. Canada proposed quotas for cod and herring, as well as regulations for other stocks, in Subarea 4⁶.

SECTION 3. The United States and Canada Used the Concept of Coastal-State Preferences Against Distant-Water States; The Second-Tier Quotas Reflect the Predominant Interest of the United States in Subarea 5

57. Beginning in 1972, after the Convention was amended to authorize national quotas, it became necessary to allocate catches of some stocks among the various States. Both the United States and Canada argued that a substantial portion of the national quotas should be allocated to the coastal States. "Coastal State preference" was their common defense against the huge distant-water fleets. For tactical reasons, it was often in the interests of both the United States and of Canada to be treated as coastal States both in Subarea 4 and in Subarea 5. Nonetheless, the United States was clearly the dominant State in Subarea 5, and Canada was the dominant State in Subarea 4.

58. The United States first proposed the concept of a coastal-State preference in 1970, in anticipation of the imposition of national quotas. This proposal related only to haddock catches in Subarea 5. The United States recommended that, for the near-term,

"(1) . . . haddock stocks in Subarea 5 be reserved to the U.S., with incidental catches only permitted to the fishermen of other

¹ *ICNAF Proceedings*, 1973, pp. 157-184; see generally the summaries of meetings of Panels 4 and 5 for the Canadian and United States regulatory proposals. Pollock is a cross-Subarea stock. See Figures 7 and 36 of the United States Memorial and Part III, Chapter III, Section 7, and Annex 1 of the United States Counter-Memorial.

² *ICNAF Proceedings*, 1974-1975 (Special Meeting, Nov. 1974), Report of Joint Meeting of Panels 4 and 5, p. 6, Item 13.

³ *Ibid.*, (Special Meeting, Nov. 1974), Report of Joint Meeting of Panels 4 and 5, p. 7, Item 16, and App. XII.

⁴ *Ibid.*, (Special Meeting, Nov. 1974), Report of the Joint Meetings of Panels 4 and 5, pp. 7 and 11, Items 18 and 31, and App. IX.

⁵ *ICNAF Proceedings*, 1974-1975, Doc. 11, Item 6, pp. 217-219.

⁶ *Ibid.*, pp. 199-216.

member governments with some special consideration for Canadian fishermen in view of the longstanding special relationship between Canada and the U.S. in the haddock fisheries in Subareas 4 and 5¹.

The United States proposed that: for the long-term, and after the haddock stock had been rebuilt, the United States receive a coastal-State allocation of 20 per cent of the catch; 60 per cent be divided among Contracting Parties in proportion to their 1955-1964 catches; 15 per cent be divided in proportion to the recent 1967-69 period; and, 5 per cent remain unallocated². The United States proposed that the 1965-1966 catches be disregarded as representing statistical aberrations and biological catastrophes.

59. ICNAF did not act upon the United States proposal. Although allocation criteria were debated at a number of meetings, national allocations to which the Commission agreed never reflected a strict formula for allocating national quotas³. Rather, national quotas were arrived at through negotiations. In fact, as noted at paragraph 53, the difficulty of negotiating quotas required ICNAF in 1973 to begin meeting three times a year. For the most part, the national allocations reflected the recent fishing patterns. Coastal-State considerations did influence the negotiations, however, particularly the determination of national quotas for traditional fisheries such as cod, haddock, yellowtail flounder, and redfish. In this respect, the United States received preferential treatment in Subarea 5—and Canada in Subarea 4—as reflected by the fact that the United States catch in Subarea 5, and the Canadian catch in Subarea 4, were not reduced proportionately as the total catch dropped.

¹ *ICNAF Proceedings*, 1970, Doc. 16, App. I, Ann. 1. [Emphasis added.]

² *ICNAF Proceedings*, 1970, Doc. 16, App. I, Ann. 1.

³ The Commission originally attempted to use a system of quota allocations known as the "40-40-10-10 system", which would produce preliminary allocations on the following basis:

- 40 per cent of Total Allowable Catch allocated based upon a 10-year historical catch;
- 40 per cent of Total Allowable Catch allocated based upon a 3-year historical catch;
- 10 per cent of Total Allowable Catch allocated to coastal States;
- 10 per cent of Total Allowable Catch reserved for new entrants and developing fisheries.

After the preliminary allocations were made, however, States were dissatisfied with their quotas proposed on this basis and undertook negotiations with other States, seeking a more satisfactory result. Consequently, the final quotas bore little resemblance to those proposed under the "40-40-10-10" system, which was soon abandoned, and the previous years' quotas were used to set the preliminary allocations.

60. National quotas were instituted for herring in 1972 and for other species in subsequent years. Appendix Q lists the national quotas adopted by ICNAF for Subarea 5 (and Statistical Area 6) and for Subarea 4 for the years 1974, 1975, and 1976. Both the scope and the size of the national allocations confirm that the United States had the predominant interest in Subarea 5.

61. In Subarea 5 and Statistical Area 6, the United States received an allocation for every stock of fish subject to quota regulations, while Canada received allocations for only a few stocks. For example, the United States received an allocation for 1974 for each of the 12 stocks subject to quotas, while Canada received allocations of only three of these stocks. For 1975, the United States, on the one hand, received allocations for 18 of the 19 Subarea 5 stocks subject to quotas (the nineteenth, the haddock fishery, was closed for the season); Canada, on the other hand, received allocations for only two stocks. In 1976, Canada received allocations for only three of the nine categories subject to quota regulation, while the United States again received quotas in all categories.

62. The volume of each State's quotas in Subarea 5 is indicated by the second-tier quotas, which limit the total of each State's direct and estimated incidental catch of all species. Table A shows the second-tier quotas for each year for which they were set.

TABLE A
Second-Tier Quotas (Subarea 5 and Statistical Area 6)

	United States	Canada	Total (all States)
1974	195,000	25,000	923,900
1975	211,600	26,000	850,000
1976	230,000	18,000	650,000

The second-tier quota fell each year, from 923,900 metric tons in 1974, to 850,000 metric tons in 1975, to 650,000 metric tons in 1976—a 29.6 per cent decrease. Canada's quotas during these years dropped by a corresponding 28 per cent. It should be noted, however, that the United States quota increased, from 195,000 metric tons, to 211,600 metric tons, to 230,100 metric tons. Thus, the United States second-tier quota increased from 21 per cent to 35 per cent of the total. Moreover, the United States second-tier quotas were eight to ten times as large as those of Canada.

CHAPTER V

THE SCIENTIFIC RESEARCH ACTIVITIES OF THE UNITED STATES AND OF CANADA UNDER ICNAF

63. The scientific research activities of the United States and of Canada under ICNAF confirm that the United States was the State with the predominant interest in Subarea 5, and that Canada was interested principally in the major fishing banks located in Subareas 3 and 4.

Section 1. The United States Conducted Most of the Scientific Research on Georges Bank, While Most Canadian Research Concerned the Fisheries in Subareas 3 and 4

64. The United States Memorial describes the history of the scientific study of the fisheries of the Gulf of Maine and Georges Bank by the United States Government, including the establishment of the United States Fish Commission in 1871, the establishment of the Woods Hole fisheries laboratory in 1885, and the pioneering work of the United States Bureau of Fisheries in the early part of the 20th century¹. In the years prior to the formation of ICNAF, the United States conducted substantially all the research in what became ICNAF Subarea 5². Canada conducted none of this research³.

65. Throughout the duration of ICNAF, the United States, in comparison to Canada, conducted the overwhelming majority of the fisheries research in Subarea 5, while Canada conducted most of its research in Subareas 3 and 4.

66. The ICNAF *Annual Reports* list the scientific research conducted in each Subarea. These efforts are summarized in Tables B1-B25, beginning at page 47. As the tables indicate, the United States was the only Contracting Party to report scientific research in Subarea 5 until 1959. In those years, the United States also conducted research in all other Subareas; Canada, however, reported conducting research only in Subareas 1, 2, 3, and 4.

¹ United States Memorial, paras. 121-128.

² *Ibid.*, para. 128; "Bibliography, Groundfish Investigations by the U.S. Government in the Northwest Atlantic", *supra* p. 3, n. 4. ICNAF, Second Annual Meeting, 1952, Doc. V(a).

³ A. H. Needler, "Summary of Canadian Research in Convention Area", ICNAF, Second Annual Meeting, 1952, Doc. V(e), p. 2. *Reprinted at Appendix C2.*

67. As noted in the United States Memorial, between 1960 and 1976, the United States submitted 68 per cent of the total scientific research documents submitted to ICNAF concerning Subarea 5, while Canada submitted eight per cent¹. Most of the Canadian research pertained to its primary fisheries in ICNAF Subareas 3 and 4². The United States conducted research on most of the stocks in Subarea 5. In contrast, Canada's research in Subarea 5 was generally limited to the few stocks that the Canadian fishermen exploited, and the volume of this research was exceeded by the research conducted on Georges Bank by several of the distant-water fishing States. Although the United States also conducted research in Subarea 4, and Canada in Subarea 5, their respective activities in these Subareas never involved the variety of stocks or the amount of effort that each State undertook in its primary area of interest.

SECTION 2. United States Scientific Research Formed the Foundation for the Regulatory Measures Adopted by Panel 5

68. The United States conducted much of its research in order to conserve and to manage its traditional fisheries in Subarea 5. Indeed, the results of United States research provided the basis for many of the regulations adopted by Panel 5. Additionally, the United States instituted a long-term research program in Subarea 5 to monitor the effectiveness of the regulations that were adopted and, beginning in 1963, a routine yearly survey of the fish stocks in Subarea 4. Several examples of these United States efforts are provided in the following paragraphs.

69. At the first meeting of Panel 5 in April, 1951, the United States proposed minimum mesh-size regulations for the haddock fishery, supporting the proposal with the findings of its scientists. Canada questioned whether net-mesh regulations would be beneficial³. Therefore, the United States conducted more research⁴, and presented the results to a special meeting of Panel 5 in 1952⁵. The Panel agreed at that time to establish a minimum mesh size⁶. After the regulation was enacted, United States researchers monitored its effects⁷. Based upon this research, which proved

¹ United States Memorial, pp. 72-73, para. 128.

² See Tables B1 through B25 beginning at p. 47, for a summary of the research activities of the United States and of Canada, grouped by year, in Subareas 4 and 5.

³ ICNAF, Serial Doc. No. 13, *Summary Report* (Minutes) of Panel 5, 7 Apr. 1951. Reprinted at Appendix O.

⁴ Graham, *op. cit.*, pp. 23-31.

⁵ ICNAF, Report of the Meeting of Panel 5, *supra* p. 29, n. 2. Reprinted at Appendix N.

⁶ ICNAF, *Second Annual Report*, 1951-1952, pp. 13-14.

⁷ ICNAF, *Annual Proceedings*, 1954-55, p. 61.

that the mesh-size regulation did indeed protect the haddock stock, minimum mesh-size regulations also were established for the cod, yellow-tail flounder, and hake fisheries in Subarea 5, and for the cod and haddock fisheries in Subarea 4.

70. Minimum-mesh regulations, similar to those established under ICNAF, are in effect today for the United States cod, haddock, and yellowtail flounder fisheries on Georges Bank.

71. A second example of United States research furnishing the foundation for important regulatory measures is the investigation of haddock spawning on Georges Bank¹. The work, which was begun when foreign fleets began fishing the Georges Bank haddock stock in the mid-1960s², enabled United States scientists to determine the time and location of the haddock spawning. At the 1969 Annual Meeting of the Commission, the United States proposed, and Panel 5 adopted, a prohibition of all bottom-fishing in the haddock spawning areas during the months of March and April³. After it had conducted additional research, the United States proposed modifications to the closed-area regulations, which Panel 5 also adopted³. These area closures (with slight modification) are still a part of United States domestic fishing regulations.

72. The two-tier quota system, which was regarded as ICNAF's most important regulatory innovation, was also based upon scientific research conducted by the United States. In particular, it was a 1973 research paper⁴ prepared by the Northeast Fisheries Center, at Woods Hole, Massachusetts, on Cape Cod, that pointed out the intermingling of species on Georges Bank, the resulting by-catch problem, and the implications for conservation of the stocks in Subarea 5 and Statistical Area 6.

¹ *ICNAF Redbook 1969*, Part II, (Biological Studies), pp. 133-134; R. Hennemuth, *Status of the Georges Bank Haddock Stocks, and Effects of the Recent High Levels Fishing Effort, 1968*. ICNAF, Research Document No. 68/92 (Serial No. 2086).

² *ICNAF Proceedings*, 1969, Doc. 16, and App. II.

³ *ICNAF Proceedings*, 1970, Doc. 5, Item 7, *Review of Conservation Measures and Procedures for Haddock*.

⁴ B. E. Brown, J.A. Brennan, E.G. Heyerdahl, and R.C. Hennemuth, *Effect of by-catch on the Management of Mixed Species Fisheries in Subarea 5 and Statistical Area 6*, *ICNAF Redbook 1973*, Part III, Res. Doc. 73/99. Reprinted at Appendix P. See also United States Memorial para. 127, n. 3.

CHAPTER VI

UNITED STATES AND CANADIAN ENFORCEMENT ACTIVITIES UNDER THE ICNAF JOINT INTERNATIONAL ENFORCEMENT SCHEME REFLECT THE PREDOMINANT INTEREST OF THE UNITED STATES IN SUBAREA 5 AND OF CANADA IN SUBAREA 4

73. ICNAF adopted the Joint International Enforcement Scheme in 1970. The history of enforcement activities carried out by the United States and Canada under that program also confirm that the United States was the State with the predominant interest in Georges Bank, and that Canada was interested primarily in the important fishing banks in Subareas 3 and 4.

74. Both the United States and Canada were required to adopt domestic legislation implementing the inspection program, as provided by the 1970 Joint International Enforcement Scheme, before they could permit their vessels to be boarded and inspected on the high seas by other States, and before they could board and inspect foreign-flag vessels. The United States enacted the necessary legislation on 11 August 1971¹. The United States Coast Guard began boarding foreign vessels that same day. Canada, however, was not ready to participate in the joint enforcement program until 1 July 1973.

75. The United States designated three Coast Guard cutters as inspection vessels in 1971. The number of United States inspection vessels increased to eight by July, 1973, and to 18 by July, 1975. United States boardings and inspections of foreign vessels increased correspondingly, from 16 in 1971 to 574 in 1976².

76. The United States conducted aircraft patrols, and inspected foreign vessels throughout the year and throughout Subarea 5, including Georges Bank, and did so for at least three months of the year in Subarea 4³. Canada, by contrast, concentrated its enforcement efforts in Subareas 3 and 4.

¹ 16 U.S.C. secs. 981 - 991; *repealed by* 16 U.S.C. secs. 1801, 1881 (1976).

² These statistics regarding the boardings and inspections were compiled from the reports filed by the enforcement officers. The records of United States boardings were reviewed at the regional headquarters of the National Marine Fisheries Service, Gloucester, Massachusetts. The records of Canadian boardings were reviewed at the headquarters of the Northwest Atlantic Fisheries Organization (NAFO). NAFO is the successor organization to ICNAF and maintains archives of all ICNAF documents.

³ The United States Coast Guard conducted surveillance flights of Subarea 5 on a weekly basis beginning in 1969. The flights were conducted year-round, and, *(footnote continued on next page)*

77. Boardings and inspections under the ICNAF Joint International Enforcement Scheme were most prevalent in 1976, the last year of fishing before the establishment of 200-nautical-mile zones by the United States and Canada. In that year, the United States inspected 574 vessels, including 84 vessels in the area between the boundary proposed by the United States and the Canadian line. Canada inspected 539 vessels, including 25 in the area between the boundary proposed by the United States and the Canadian line. Figure 4 illustrates the locations of the boardings and inspections conducted during 1976 in the vicinity of Georges Bank. Quite clearly, the United States assumed the responsibility for implementing the ICNAF Joint International Enforcement Scheme in Subarea 5, and in particular on Georges Bank and on the northeastern portion of the Bank, while Canada conducted most of its enforcement activities on the large fishing banks to the north. Figure 5 is a plot of the locations of United States and Canadian boardings on a smaller scale chart. As demonstrated, Subarea 5 was the primary focus of United States' enforcement operations, and Canadian enforcement operations were largely confined to Subareas 3 and 4.

(footnote continued from previous page)

during summer months, the number of flights often reached four per week. Canada conducted occasional flights in Subarea 4; however, Canada's overflights of Subarea 5 were normally limited to the months of March, April, and May, when the United States and Canada conducted joint enforcement operations to ensure compliance with the closed-area regulations.

CONCLUSION

78. The history of ICNAF must be viewed from two perspectives. On the one hand, ICNAF was transformed, under the leadership of the United States, into the most modern and innovative international fishery-management organization in the world. On the other hand, notwithstanding the rapid expansion of its regulatory authority during the 1970s, ICNAF was unable to exert sufficient control over the large, distant-water fleets¹.

79. Moreover, the United States was unable, within ICNAF, to protect its traditional fisheries. It was the historic interest of the United States in the fisheries off its coast, especially the Georges Bank fishery, that had prompted the United States to seek the establishment of ICNAF; to devote significant diplomatic, scientific, and policing efforts, over the course of many years, to the goal of making ICNAF effective; and, ultimately, to withdraw from ICNAF and to extend its exclusive fishery-management jurisdiction to a distance of 200 nautical miles.

80. The United States and Canada often cooperated within ICNAF to protect their fishermen from the distant-water fleets. Each concentrated its efforts, however, on the fisheries off its own coast. In Subarea 5, the United States provided the leadership, conducted most of the research and enforcement, proposed most of the management measures, and received the bulk of the allocations based on coastal-State preference. Canada, on the contrary, concentrated its resources on the management of the vast fisheries in Subareas 2, 3, and 4.

81. Each State also was involved, to a lesser extent, in the fisheries located outside its area of primary interest. The United States was an original member of Panel 4 and Canada an original member of Panel 5. The United States fished in Subareas 3 and 4, and Canada fished in Subarea 5. Canada's secondary involvement in Subarea 5, however, did not amount to an equal "partnership" with the United States. Accordingly, it no more entitles Canada to a share of Georges Bank than the interests of the United States in Subareas 3 and 4 entitles it to a share of the fishing banks located there.

¹ The increase in foreign fishing activity in Subareas 3, 4, and 5 is illustrated at Figure 10 of the United States Memorial.

TABLES B1 through B25

Tables B1 through B25 provide a summary of the major activities of the United States and Canada for the period 1951 through 1976. The tables were prepared from *ICNAF Annual Proceedings* and *ICNAF Proceedings*. The tables outline the major management proposals and scientific research activities by the United States and Canada in regard to Subareas 4 and 5. Additionally, the tables provide a summary of the major actions of the United States and Canada affecting the Commission as a whole.

The tables demonstrate that, under ICNAF, each State assumed a leadership role with respect to the Subarea contiguous to its coast. For the United States, this was Subarea 5; for Canada, it was Subarea 4.

Table B1

ACTIVITY	1950 - 1951				
	UNITED STATES		CANADA		
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTIONS BY JOINT PARTIES IN THE CONVENTION AREA
TOTAL CATCH (in metric ton round weight)					
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Proposed no STOCKS maximum mesh size for HADDOCK fishery	1. U.S. proposes that regulatory measures taken in Subarea 5 be coordinated with Subarea 4			
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Research by with the possible benefits of net mesh regulations for the Georges Bank HADDOCK fishery				
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION					

1951 - 1952		CANADA				SIGNIFICANT ACTORS BY 3RD PARTIES IN THE CONTENTION AREA	
ACTIVITY		UNITED STATES		CANADA		SIGNIFICANT ACTORS BY 3RD PARTIES IN THE CONTENTION AREA	
		Subarea 5	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTORS BY 3RD PARTIES IN THE CONTENTION AREA	
TOTAL CATCH * (in metric ton round weight)		199,877 (m.t.)	106,638 (m.t.)	None	171,849 (m.t.)		
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA		1. Based upon experiments carried out in 1951 by the U.S. Fish and Wildlife Service, the U.S. recommended that the 3 3/4 inch minimum mesh size for HADDOCK be enlarged to 4 1/2 inches.		1. Supported the U.S. on implementation of mesh regulations for HADDOCK.			
SCIENTIFIC ** RESEARCH IN THE SUBAREA		1. Investigation into effects of mesh regulation to increase the yield of Georges Bank HADDOCK.		1. Cooperated with U.S. on research into minimum mesh size for HADDOCK.			
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION		1. U.S. Requested Membership on Panel 3					

* Groundfish only.

** Although member nations reported their research activities of the year 1951, ICNAF did not publish summaries in the annual report.

Table B3

ACTIVITY	1952 - 1953				
	UNITED STATES		CANADA		
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
TOTAL CATCH * (in metric tons, round weight)	189,548 (m.t.)	67,360 (m.t.)		194,858 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Proposed amendment to HADDOCK mesh size regulations pertaining to methods of measuring mesh size				
SCIENTIFIC RESEARCH IN THE SUBAREA	1. HADDOCK - Georges Bank population studies fecal studies, distribution food habit, effect of mesh regulation, gear selectivity 2. WHITING - relationship to HADDOCK 3. REDFISH - age and growth studies 4. GOOMPHUS distribution	1. HADDOCK - fecal studies 2. REDFISH abundance		1. Stock identification - COD, REDFISH, HADDOCK, HALIBUT 2. COD - marketing studies 3. HADDOCK - marketing studies 4. Hydrographic studies - Bay of Fundy, Scotian Shelf, Gulf of St. Lawrence	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION					

ACTIVITY	1953 - 1954			CANADA			SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	UNITED STATES						
	Subarea 5	Subarea 4		Subarea 5	Subarea 4		
TOTAL CATCH* (in metric ton round weight)	155,239.5 (m.t.)	46,991.3 (m.t.)		76.4 (m.t.)	152,001.6 (m.t.)		
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA							
SCIENTIFIC RESEARCH IN THE SUBAREA	1. HADDOCKs - effects of mesh regulation and escapement program, and population study Food Habits Drift of Eggs and larvae 2. REDFISH - age and growth abundance 3. COD	1. HADDOCK - abundance, drift of eggs and larvae 2. COD - catch sampling 3. REDFISH - abundance			1. Stock Identification - COD, HADDOCK, REDFISH, TLOUNDER 2. COD - population dynamics, and tagging 3. HADDOCK - population dynamics, and tagging 4. Hydrography - Bay of Fundy, Gulf of St. Lawrence, Saguenay Strait 5. Effect of mesh size on small HADDOCK and COD		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION							

* Groundfish only.

Table 85

ACTIVITY	1954 - 1955				CANADA		SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	UNITED STATES		Sabana 4	Sabana 5	Sabana 4	Sabana 5	
TOTAL CATCH * (in metric ton dried weight)	Sabana 5		64,564 (m.t.)	1,148 (m.t.)	334,756 (m.t.)		
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	412,317 (m.t.)				1. Minimum mesh size regulations established for COO and HADDOCK.		
	1. Minimum mesh size regulations for HADDOCK expanded to include COO. 2. 1% exemption for 5000 lbs for incidental catch of COO and HADDOCK for exports using endermane mesh and NOT fishing primarily for COO and HADDOCK.						
SCIENTIFIC RESEARCH IN THE SUBAREA	1. HADDOCK - Georges Bank population studies, effects of mesh regulation, effects of overexploit, food habits, drift of eggs and larvae, and tagging experiments. 2. SILVER HAKE - mesh selection. 3. YELLOWTAIL FLOUNDER - abundance studies. 4. REDFISH - age and growth abundance studies, and breeding habits.	1. HADDOCK - food habits, abundance studies, age and growth studies			1. COO - yield, gear selectivity, effects of mesh regulations and tagging. 2. HADDOCK - yield, gear selectivity, effects of mesh regulations and tagging. 3. REDFISH - migrations		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION							

Table B8

1955 - 1956						
ACTIVITY	UNITED STATES		CANADA			SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	Subarea 4	
TOTAL CATCH (in metric tons, rounded weights)	368,350 (m t)	64,478 (m t)	1,872 (m t)	338,032 (m t)		
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. U.S. proposed to amend the CDO and HADDOCK regulations to provide a 10% annual exemption for the net mesh regulations					
SCIENTIFIC RESEARCH IN THE SUBAREA	1. REDFISH - distribution of fish, eggs, and larvae 2. HADDOCK - distribution of fish, eggs, and larvae 3. HAKE - distribution of fish, eggs, and larvae 4. FLOUNDER - distribution of fish, eggs, and larvae 5. Experimental fishing for the location of new stocks	1. HADDOCK - growth studies and population dynamics		1. CDO - population dynamics study of CDO in Subarea 41 and tagging in the Bay of Chaleur region of the Gulf of St. Lawrence 2. HADDOCK - obolites 3. Mesh selection - selective properties of cotton and nylon meshes were compared with those of canvas meshes 4. REDFISH - growth and maturity in Subarea 41 5. HALIBUT - statistics of landings were reviewed.		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. Special Ad Hoc Committee on Administrative and Management Measures was established to consider questions relating to U.S. proposal for 10% annual exemption.					

* Canada was reluctant to adopt this form of exemption, but it could accept annual exemption as an experiment in Subarea 4 only as an alternative to per trip exemption, and on an experimental basis (two years).

Table 67

1956 - 1957					
ACTIVITY	UNITED STATES		CANADA		
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
TOTAL CATCH (in metric tons round weight)	468,674 (m.t.)	60,546 (m.t.)	3,737 (m.t.)	384,313 (m.t.)	1. All members in 4 except Italy and Spain reported research work.
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA					
SCIENTIFIC RESEARCH IN THE SUBAREA	1. HADDOCK - distribution study 2. REEFISH - distribution study 3. SILVER HAKE - intensive studies 4. RED HAKE - intensive studies 5. Hydrographic studies	1. HADDOCK - joint age study with Canada 2. COD - distribution study		1. COD - tagging, stock and study in landings 2. HADDOCK - age study 3. Experiments on mesh selection and with double codends were carried out.	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. The Commission relied from information by the Depositary Government (United States) and by delegates that the governments of all participating countries concerned had accepted or were to do so at the very near future the final regulations for COD and HADDOCK fisheries in Subarea 3, 4 and 5 proposed by the Commission in its 1955 Annual Meeting. France, however, had reservations as to methods of mesh measuring and closure for closing gear.				

Table B4

1957 — 1958					
ACTIVITY	UNITED STATES		CANADA		SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	Sabana 5	Sabana 4	Sabana 5	Sabana 4	
TOTAL CATCH (in metric ton mixed weight)	504,897 (m.t.)	59,195 (m.t.)	9,382 (m.t.)	1,390,448 (m.t.)	1. The Union of Soviet Socialist Republics and the Federal Republic of Germany became members of the Commission
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA					
SCIENTIFIC RESEARCH IN THE SUBAREA	Data on researches in the Sabana were reported only by U.S.A. 1. HADDOCK — tagging, age determination, effects of mesh regulation 2. COD — delineation of stocks, effects of mesh regulations, parasites 3. HALIBUT — tagging 4. SILVER HAKE — tagging 5. TROUTMOUTH — effort and abundance studies 6. REDFISH — distribution and abundance 7. SEA SCALLOPS 8. Plankton and Bottom Ecology	1. HADDOCK — tagging 2. REDFISH — abundance studies 3. HALIBUT — tagging	1. Joint tagging with U.S. (500 or more fish)	Data on researches in the Sabana were reported only by Canada 1. HADDOCK — tagging, age determination 2. COD — tagging, parasites, growth effects of mesh reg. 3. REDFISH — Stock dynamics 4. Hydrographic Research	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION					

Table B9

1958 — 1959						
ACTIVITY	UNITED STATES		CANADA		SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA	
	Subarea 5	Subarea 4	Subarea 5	Subarea 4		
TOTAL CATCH (in metric ton round weight)	445,542 (m.t.)	56,492 (m.t.)	13,108 (m.t.)	382,839 (m.t.)		
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA						
SCIENTIFIC RESEARCH IN THE SUBAREA	The HUDDOCK tagging program in Subdivisions 41, 51, and 52 continued in 1958 1. HUDDOCK — age composition, tagging ecology, effects of mesh regulation 2. COD — parasites, age/growth studies 3. EQUINER — growth studies, abundance 4. SILVER HAKE — tagging habits, abundance 5. REDFISH — growth, abundance, parasites, local studies, larval distribution 6. SEA SCALLOPS — abundance 7. Plankton ecology	1. HUDDOCK — Cooperative studies with Canada 2. REDFISH — abundance and local studies	1. SCALLOP — observations	1. HUDDOCK — tagging 2. AMERICAN PLUCE — tagging 3. COD — abundance studies 4. Oncards — effect on groundfish stocks 5. Gear selectivity 6. Hydrographic research 7. REDFISH — abundance		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. The need for more research possibilities and for closer co-operation is urgent. The introductory remarks conclude with the statement that the effectiveness of the Committee's work suffered from the fact that all countries were not fully represented at the Annual Meeting by scientific advisers					

ACTIVITY	1959 — 1960				
	UNITED STATES		CANADA		
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
TOTAL CATCH (in metric ton round weight)	437,378 (m.t.)	46,666 (m.t.)	21,394 (m.t.)	359,131 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Proposal to continue two years (the 10% vessel exemption in the mesh regulation experiment). 2. A review and evaluation of the two-year 10% annual exemption experiment in Subarea 5 was presented by the United States, which requested a two-year continuation of the experiment. The Panel recommended that the request be granted.				
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Research of SEA SCALLOPS, SILVER HAKE, REDFISH COO, and HADDOCK was intensive. 2. HADDOCK — young of the year survey. 3. COO — egg and larvae survey using drift bottles. 4. REDFISH — station stock sampling. 5. FLOUNDER — 3000 tagged. 6. SILVER HAKE — reasonable distribution study. 7. SEA SCALLOPS — study of growth and maturity rates.		1. SCALLOPS — abundance, mortality and discard studies.	1. COO — size, growth, migration currents. 2. HADDOCK — gear experiments (Danish-Swedish). 3. SCALLOPS — gear selectivity. 4. Commercial fishing was assessed by a scientific and sampling program on landings.	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION					

Table B11

ACTIVITY	1960 - 1961				CANADA		SIGNIFICANT ACTIONS BY JRD PARTIES IN THE CONVENTION AREA
	UNITED STATES		Schedule 4	Schedule 5	Schedule 4	Schedule 5	
TOTAL CATCH (in metric tons, rounded weights)	Schedule 5	Schedule 4	50,552 (m.t.)	31,679 (m.t.)	389,376 (m.t.)		
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	Schedule 5: 411,518 (m.t.) - No change in mesh regulations for CDD or HADDOCK recommended - Mesh size for FLOUNDER is being considered				- No change in mesh regulations. Remains 4 1/2" for CDD and HADDOCK. However extending requirement to FLOUNDER was recommended - Feasibility of offtake chafing gear considered		
SCIENTIFIC RESEARCH IN THE SUBAREA	- Market samples at all major ports continued - HADDOCK - critical review of the scale method for age determination completed - CDD - age composition study started - Drift bottles show no clear pattern - SILVER HAKE - study of winter distribution - REINISH - Recorders of tagged fish for estimates on population and mortality - YELLOWTAIL - - FLOUNDER - estimates, mortality and age and growth rate - SEA SCALLOP - estimates, mortality and age and growth rate - Scorpaenid and Tuna study	Hydrographic study on the Gulf Stream from surface to bottom		SEA SCALLOP - study on existing effects on temperature changes and exposure	- CDD - studies - HADDOCK - studies - GROUNDFISH - studies - Drift bottle experiments		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	It was noted there is new evidence that it may be advantageous to use a maximum ring size in SCALLOP traps and it was agreed that the scientific advisors be asked to provide a basis for considering an appropriate regulation at the next Annual Meeting						

Table B12

ACTIVITY	1961 — 1962				
	UNITED STATES		CANADA		
	Schedule 5	Schedule 4	Schedule 5	Schedule 4	SIGNIFICANT ACTIONS BY JED PARTIES IN THE CONTENDING AREA
TOTAL CATCH (in metric ton round weight)	30,121	42,071	25,296	350,421	1. USSR Dredgeable survey especially in the Georges Bank area. HERRING population studies in the Georges Bank area
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA					
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Hydrographic surveys 2. Release of drift bottles 3. Sediment studies 4. Benthic invertebrate studies 5. Sampling of landings for major commercial species 6. Haddock — length and age studies, distribution and abundance of pre-recruit 7. COD — length and age studies 8. SILVER HAKE — length and age studies, mesh selectivity studies 9. HUTTON — biomass studies and tagging 10. YELLOWTAIL — growth studies 11. FLUKE — spawning studies 12. Studies on seasonal mesh size for codends 13. SEA SCALLOP — studies 14. Studies on abundance of fishable stocks	1. Sampling of commercially caught fish	1. Hydrographic observations in Gulf of Maine 2. POLLOCK — research 3. HERRING — research 4. SEA SCALLOP — research	1. Studies of water circulation 2. GROUNDFISH — surveys 3. Recreational studies 4. COD — special studies in recruitment, growth, and mortality and tagging 5. Collection of data on discards 6. Market sampling of commercially important species	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION					

Table B13

ACTIVITY	1962 -- 1963				
	UNITED STATES		CANADA		
	Subarea 3	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
TOTAL CATCH (in metric ton round weight)	427,769 (m.t.)	39,741 (m.t.)	54,975 (m.t.)	417,186 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA					
SCIENTIFIC RESEARCH IN THE SUBAREA	- Oceanographic post observations - Release of drift bottles and seabed drifters - Beach studies - Analysis of commercial landings statistics - HERRING — research - SCALLOP — abundance studies - Monitor studies of 10% Annual Exemption Program	- Commercial GROUNDFISH sampling of catches - Hydrography studies in benthic communities - Studies in currents - Studies in fish eggs - Studies in larvae - HADDOCK — cooperative research with Canada - HERRING — intensive study	- POLLOCK — studies - HERRING — studies - SEA SCALLOP — studies	- Studies of water circulation - Zooplankton collections in 41 - Fish eggs and larvae studies - COD — survey, migration study - HADDOCK — survey - REDFISH — survey - POLLOCK — survey, migration study - AMERICAN PLACE — survey - HERRING — movement of larval - Discards at sea of fish caught in commercial trawls	Proposal to Convention to allow Commission to make recommendations for international measure of control.
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION					

1963 - 1964

UNITED STATES

CANADA

SIGNIFICANT ACTIONS BY JRD
PARTIES IN THE CONVENTION AREA

TOTAL CATCH (in metric tons reported weight)	412,553 (m.t.)	39,786 (m.t.)	70,206 (m.t.)	460,335 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA				1. Extension of 10% Annual Exemption from mesh regulations to Subareas 4 and 5	
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Environmental studies 2. Analysis of commercial landings statistics 3. GROUPOFISH — ecology and population dynamics 4. HERRING — studies in larvae and adults 5. HADDOCK — pre-recruitment studies and abundance 6. SEA SCALLOPS — abundance studies 7. Report on operation of 10% Annual Exemption	1. HADDOCK — commercial sampling, analyzed	1. HADDOCK — sampling 2. HERRING — sampling 3. SCALLOP — gear and selectivity 4. SNOWFISH — studies	1. Studies of long-term trends in hydrographic features of near-shore drift 2. Surveys of benthic communities 3. COD — identification of stock, growth and migration studies, tagging 4. HADDOCK — distribution pattern 5. REDFISH — distribution and abundance 6. HALIBUT — tagging, age and growth studies 7. WOLFFISH — studies 8. HERRING — studies 9. SEA SCALLOP — studies	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. U.S. research reveals that further increases in fishing intensity would cause total catch to exceed maximum sustainable yield. 2. U.S. proposal for changes to Article VIII, para. 7 3. U.S. proposal for changes to Article VIII, para. 7 4. U.S. proposal for changes to Article VIII, para. 7 5. U.S. proposal for changes to Article VIII, para. 7 6. U.S. proposal for changes to Article VIII, para. 7 7. U.S. proposal for changes to Article VIII, para. 7 8. U.S. proposal for changes to Article VIII, para. 7 9. U.S. proposal for changes to Article VIII, para. 7 10. U.S. proposal for changes to Article VIII, para. 7 11. U.S. proposal for changes to Article VIII, para. 7 12. U.S. proposal for changes to Article VIII, para. 7 13. U.S. proposal for changes to Article VIII, para. 7 14. U.S. proposal for changes to Article VIII, para. 7 15. U.S. proposal for changes to Article VIII, para. 7 16. 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Table B15

1964 - 1965						
ACTIVITY	UNITED STATES		CANADA		SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA	
	Subarea 5	Subarea 4	Subarea 5	Subarea 4		
TOTAL CATCH (in metric ton round weight)	347,220 (m.t.)	40,251 (m.t.)	75,178 (m.t.)	481,115 (m.t.)	1. Extension of 1955 Annual Complan from mesh regulation in Sub 4 and 5	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA						
SCIENTIFIC RESEARCH IN THE SUBAREA	1. HADDOCK - studies continued 2. SILVER HAKE - studies continued 3. HERRING - studies continued 4. YELLOWTAIL - studies continued 5. WINTER FLOUNDER - studies continued 6. Benthic and environmental studies throughout Gulf of Maine 7. USA and USSR drawing up plans for an environmental survey of Georges Bank - Gulf of Maine area	1. HADDOCK - distribution studies, year-classes abundance 2. GROUNDSTICK - distribution studies	1. Studies of northward drift in Bay of Fundy 2. COD - studies 3. HADDOCK - studies 4. HERRING - studies 5. SPORONISH - studies 6. SEA SCALLOP - studies	1. Detailed bottom topography for restricted area 2. Benthic and plankton studies 3. Egg and larval studies 4. COD - population and feeding habits, tagging 5. HADDOCK - year-classes strength 6. AMERICAN PUCE - effects of COD grazing 7. WITCH - age and growth studies, tagging 8. HERRING - weights and age study, tagging 9. HALIBUT - tagging 10. Study on discards		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. Joint enforcement system under consideration 2. U.S. Research vessels that Georges Bank is being exploited beyond the estimated sustainable yield 3. U.S. exchanges enforcement officials with Canada and the USSR 4. Note on procedure by U.S. regarding the entry into force of amendments.					

1965 — 1966					
ACTIVITY	UNITED STATES		CANADA		SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	
TOTAL CATCH (in metric ton round weight)	312,454 (m.t.)	35,734 (m.t.)	50,046 (m.t.)	572,504 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. U.S. commented on mesh selection experiments involving SILVER HAKE and RED HAKE. Results indicate that 71:23 mm mesh nylon nets cannot be used for these fisheries				
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Benthic surveys 2. GROUNDFISH — surveys 3. Penfish surveys 4. HADDOCK — zoological studies 5. HERKING — zoological studies, behavior, fecal, and age studies 6. REDFISH — age and growth studies 7. SILVER HAKE — age and growth studies	1. HADDOCK — cooperative study 2. ARGENTINES — life history	1. ARGENTINES studies 2. SILVER HAKE — exploratory fishing and studies 3. HERKING — exploratory fishing and studies 4. SPONDYLL — exploratory fishing and studies	1. COD — population in On. 41 2. HADDOCK — year-class strength 3. WITCH — age, growth and validation studies, tag-recapture 4. HERKING — tagging, age, growth and fecal studies 5. SCALLOP — potential recruitment 6. HALIBUT — fishery study 7. PLACE and YELLOWTAIL — length-weight relationships 8. Studies of landed fish size in relation to fishing practices	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. U.S. presented paper on Economic Aspects of fisheries management.		1. Panel A created to deal with HARP and HODD SEAL, Capelin, Herring, Norway members 2. Proposal regarding use of casting gear on COD ends		

Table B17

ACTIVITY	1966 — 1967				SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	UNITED STATES		CANADA		
TOTAL CATCH (in metric ton round weight)	Subarea 5 294,236 (m.t.)	Subarea 4 34,091 (m.t.)	Subarea 5 84,496 (m.t.)	Subarea 4 \$85,697 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Proposal for consideration of additional conservation to reduce over-fishing of Subarea 5 HADDOCK, including consideration of quotas.				1. Roussau becomes member of Panel 5
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Hydrographic, plankton, and benthic surveys 2. HADDOCK — biological studies 3. SILVER HAKE — biological studies 4. HERRING — biological studies 5. LOBSTER — biological studies 6. GROUNDROCK — surveys 7. SILVER HAKE — age and growth studies	1. HADDOCK — studies on stocks for age rating of in 4's 2. HERRING — lengths, age, and 3. HAKE — identity of species	1. HADDOCK — biological studies 2. SCALLOP — biological studies 3. HERRING — biological studies 4. SNOWFISH — biological studies	1. Surface and bottom circulation 2. Distribution of plankton 3. Benthos Studies 4. COD — population and biology studies 5. HADDOCK — size, age, and recruitment studies 6. HERRING — biological studies 7. LOBSTER — biological studies 8. YELLOWTAIL FLOUNDER — biological studies 9. SEA SCALLOPS — biological studies 10. MACAREL — spawning studies 11. TUNA — tagging studies 12. SALMON — tagging studies	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. Proposal for simplification of regulations in Area 2. U.S. requests expedited action on development and implementation of Joint Enforcement Scheme similar to the scheme adopted by the Northeast Atlantic Fisheries Commission (NEAFC).		1. Proposal for regulation of SEAL fishing 2. Proposal to prohibit fishing for ATLANTIC SALMON		

Table B18

ACTIVITY	1967 - 1968				CANADA		SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	UNITED STATES				Subarea 5	Subarea 4	
TOTAL CATCH (in metric ton round weight)	Subarea 5	Subarea 4	Subarea 5	Subarea 4	80,619 (m.t.)	608,742 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	Subarea 5 273,980 (m.t.) 1. U.S. requests special conservation action to protect SA-S HADDOCK stocks 2. Pending action on implementation of quotas or effort limitation in SA-S. U.S. request informal agreement among member nations regarding Georges Bank HADDOCK stock	Subarea 4 29,643 (m.t.)	Subarea 5 80,619 (m.t.)	Subarea 4 608,742 (m.t.)			
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Extensive hydrographic studies 2. Fisheries productivity studies 3. Coastal upwelling studies 4. Macrobenthos studies continued 5. HADDOCK - Studies on population structure 6. GROUNDFISH - Joint US/USSR survey 7. SILVER HAKE - abundance studies 8. TUNA - tagging 9. ATLANTIC SALMON - smolt tagging 10. HERRING - growth studies	1. Cooperative studies by USA and Canada on Age composition in Div. 43 2. GROUNDFISH - survey in Div. 43	1. SCALLOPS - collaborative catch statistics collection on Georges Bank 2. SWOOFISH - research	1. Surface temperature surveys 2. Sedimentological and geochemical studies in Gulf of St. Lawrence 3. COD - survey 4. HAKE - tagging 5. Studies on SILVER HAKE, ARGENTINES HERRING, REEFISH, SCALLOPS, MACKEREL, SMOGT, FISH, TUNA, and ATLANTIC SALMON	USA/USSR Joint Survey Subarea 5 The USA and USSR made comparative and simultaneous joint surveys in Subarea 5 for both Pristigaster and GROUNDFISH comparing vessels and gear. The USA vessel was Albatross IV of 1,200 gross tons and the USSR vessel, the Albatross, of 500 gross tons. The data from the statistically designed experiments have been only partly analyzed but already have shown the value of such collaborative and joint field experiments. This research has been reported by both parties as highly informative, useful and successful.		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. U.S. proposal to amend the Convention to allow for greater flexibility in regulatory measures, and the use of scientific and economic factors to assess the same 2. U.S. suggests that antismoking scheme under consideration by the Commission be strengthened 3. Proposal regarding a possible method of allocating national quotas		1. Proposal restricting increases in high seas fisheries for ATLANTIC SALMON				1. USSR - Proposal regarding allocation of national quotas

Table B19

1968 - 1969						
ACTIVITY	UNITED STATES		CANADA		SIGNIFICANT ACTIONS BY JOINT PARTIES IN THE CONVENTION AREA	
	Subarea 5	Subarea 4	Subarea 5	Subarea 4		
TOTAL CATCH (in metric tons fresh weight)	228,981 (m.t.)	25,723 (m.t.)	99,674 (m.t.)	752,915 (m.t.)	1. Poland becomes a member of Panel 5	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Proposal for limitation on total HADDOCK catch in Subarea 5 2. Proposal for establishment of closed seasons of the RED and SILVER HAKE fishing in S.A.5 3. Proposal for closure of portion of S.A.5 to protect Georges Bank HADDOCK during the spawning season			1. Proposal regarding limitation of total HADDOCK catch in Div. 41		
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Plankton surveys 2. Cooperative environmental surveys with USSR and Canada 3. Benthic studies 4. HADDOCK — population dynamics, and distribution of spawning 5. SILVER HAKE — length-weight and age wild-iron studies 6. Studies to monitor plankton in Gulf of Maine 7. HERRING — larvae studies 8. LOBSTER — population and culture studies 9. Report on operation of 10% Annual Exemption from mesh regulations	1. HADDOCK — cooperative studies with Canadian scientists in Div. 41	1. SCALLOP — collection of statistics 2. HERRING — larval abundance 3. SNOWBUSH — biology	1. Sampling of Plankton, fish eggs and larvae 2. Ice forecasting 3. Studies in Oceanography 4. COD — surveys 5. SILVER HAKE — biology 6. HERRING — studies (Bay of Fundy) 7. MACKEREL — sampling 8. Experimental fishing with acoustic echo counting equipment 9. SCALLOP — studies 10. SALMON — smolt tagging 11. HADDOCK — surveys		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. Proposal modification to 1968 proposal regarding possible methods of allocating national quotas 2. Requests Commission take action on protocol relating to regulatory measures. 3. Draft protocol relating to panel membership (Joint-US-CAE) 4. Proposal to have SIACKEM examine administrative, legal and technical problems of establishing a system of effort limitation.		1. Proposal regarding conservation of HARP SEALS 2. Draft protocol relating to panel membership (Joint US-CA)			

1969 - 1970				
ACTIVITY	UNITED STATES		CANADA	
	Subarea 5	Subarea 6	Subarea 5	Subarea 4
TOTAL CATCH (in metric ton rounded weight)	252,510 (m.t.)	18,367 (m.t.)	80,493 (m.t.)	727,276 (m.t.)
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Proposal to increase the closed season for Georges Bank Haddock by 1 month and change in size of closed area 2. Both coast quota and mesh size regulations for YELLOWTAIL TROUT 3. Closed season for SILVER and RED HAKE 4. At a January 1970 meeting of STAGREW, the United States proposed the nations (along w' SA-S meet the web before the 1970 Annual Meeting to discuss the application of the principles of national quotas to SA-S HADDOCK			1. Proposal including quota regulations and closed area regulations for Dn 40W
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Hydrographic and zooplankton studies in Gulf of Maine 2. Develop quantitative plankton gear 3. HADDOCK - population dynamics 4. GROUNDPIPER - joint US-USR surveys 5. HERRING - population studies 6. LOBSTER - stocks, including tagging 7. YELLOWTAIL - population dynamics	1. Hydrographic surveys 2. HADDOCK - cooperative studies with Canada	1. SEA SCALLOP - collaborative studies with U.S. scientists 2. HERRING - larval abundance and distribution 3. SWORDFISH - biology 4. BLUE SHARKS - biology	1. Surface circulation studies 2. Zooplankton survey 3. COD - egg and larval studies 4. GROUNDPIPER - surveys 5. SEA SCALLOPS - abundance 6. SILVER HAKE - biology 7. MACKEREL - sampling 8. Trial fishing with acoustic echo counting
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. Mutual exchanges of enticement officers considered useful and successful 2. U.S. proposal regarding a protocol to the Convention to facilitate amendments to the Convention 3. Proposed Declaration of Understanding that reciprocal procedure for entry into force of regulations would apply to HERRING and HOOK SCAL regulations 4. Proposal on application of national quotas		1. Proposal regarding conservation of SEALS 2. Proposal regarding conservation of HERRING in the Convention Area	

Table B-21

1970 — 1971					
ACTIVITY	UNITED STATES		CANADA		SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	
TOTAL CATCH (in metric ton round weight)	257,680 (m.t.)	13,233 (m.t.)	47,353 (m.t.)	714,609 (m.t.)	1. Both Federal Republic of Germany and Japan are approved for membership in Panel 5 2. Japan approved for membership in Panel 4 3. Joint international enforcement scheme came into effect
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Application of mesh regulations and total catch quota of YELLOWTAIL FLOUNDER 2. Proposal for reduction of total quota for HADDOCK, giving Commission authority to close fishery to prevent overfishing of quota, and extension of time and areas for spawning season closure 3. U.S. made an informal proposal on future allocations of national quotas for SA-5 HADDOCK	1. Reduce quotas for HADDOCK		1. Proposals for lowering quota and extending closed fishing season for SA-4 HADDOCK	
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Hydrographic and ichthyoplankton studies conducted with USSR 2. HERRING — population studies 3. HADDOCK — population studies 4. YELLOWTAIL — population studies 5. LOBSTER — population studies 6. Study of 10% Annual Exemption from the mesh regulations	1. GROUNDFISH — surveys 2. Hydrographic surveys (U.S. Coast Guard) 3. HADDOCK — assessments	1. SEA SCALLOP — population estimates and gear selection experiments 2. HERRING — cooperative US and USSR surveys of Georges Bank for spawning beds	1. GROUNDFISH — non-halibut drift (surface and bottom), egg, and larva studies, and population dynamics 2. HERRING — larva studies 3. COD — population dynamics and ecology studies 4. HADDOCK — population dynamics 5. Studies of SAND LAUNCE, ARGENTINES, HERRING, SMORFISH, TUNA, and SALMON	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. U.S. Coast Guard begins enforcement of regulation under the International Inspection Scheme 1 July 1971 2. US-USSR joint memorandum on use of fishing scale in national quota allocations 3. Proposal for HERRING conservation (joint US/CA) 4. U.S. memorandum on conservation of ATLANTIC SALMON 5. U.S. proposes special meeting for June 1972 to consider HERRING conservation	1. Proposal regarding conservation of SEALS in the Convention Area 2. Proposal for HERRING conservation (joint US/CA) 3. Proposal for conservation of ATLANTIC SALMON			1. Japan and USSR — opposed to US method of national quota allocations 2. Denmark — proposal for conservation of ATLANTIC SALMON

ACTIVITY	UNITED STATES			CANADA		SIGNIFICANT ACTIONS BY 2ND PARTIES IN THE CONVENTION AREA
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	Subarea 5	
TOTAL CATCH (in weight ton round weight)	246,127 (m.t.)	13,849 (m.t.)	63,793 (m.t.)	649,131 (m.t.)		1. USA proposes uniform mesh size of 130 mm in all areas for all regulated species - benefiting primarily COD, HADDOCK, and YELLOWTAIL. 2. Spain becomes a member of Panel 5
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Quota regulation of COD in SE and SW 2. Quota regulation of COD in SE and SW 3. Quota regulation of YELLOWTAIL in east of Spain 4. Quota regulation of YELLOWTAIL in west of Spain 5. Quota regulation of SILVER HAKE in SE 6. Quota regulation of SILVER HAKE from southern New England stock 7. Quota regulation of RED HAKE from the northern New England stock 8. Quota regulation for HADDOCK in SAS 9. Assessment to HADDOCK regulation to provide for closed areas 10. Closed areas for RED and SILVER HAKE 11. Proposal regarding application of seasonal quotas to HERRING		1. Proposal to limit SCALLOP size to 40 masts/pounds (23)	1. Quota regulation of COD in Subdivisions 4YS and Division 4W 2. Quota regulation of HADDOCK in Division 1YW 3. Quota regulation for New Scotia HERRING stock 400,495 4. Proposal regarding national allocations of HERRING (Special Meeting Jan 1972)		
SCIENTIFIC RESEARCH IN THE SUBAREA	1. HADDOCK - length and age composition 2. GROUNDFISH - surveys and food studies 3. HERRING larval survey 4. Flatfish survey 5. Population studies on major commercial species 6. HERRING - use of a subsurface for spawning and larval survival 7. HERRING - length and age composition 8. YELLOWTAIL - length and age composition 9. COD - length and age composition 10. HAKE - length and age composition	1. HADDOCK - abundance and sexual maturity and spawning studies with Canada	1. SEA SCALLOPS - gear selectivity and mortality rates 2. HERRING - analysis of larval studies 3. SPOTTAILS - investigation of contamination	1. HERRING - disposal of larvae off Nova Scotia 2. Documentation of catch-and-release in Gulf of St. Lawrence 3. GROUNDFISH - surveys 4. COD - age structure 5. HADDOCK - recruitment on Nova Scotia Banks 6. YELLOWTAIL FLENNER - migratory and feeding habits 7. FLATFISH - study of parasites 8. SCALLOPS - effect of dredging 9. HERRING - migration and stock studies		
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. US/Portugal propose terms of reference for Steering Committee on International Control (STATCO) 2. US proposed revision of questionnaire used by inspectors (12/71) 3. US proposal respecting withdrawal of inspectors from sea by application and seal of inspectors 4. US proposed to require reports on return on arrangements for compliance with regulations in effect in Subarea 5.					

* NOTE: This was the first year that both global and national quotas were applied to a wide variety of stocks. In succeeding years, national quotas continued to apply to almost all stocks in SA-5, and most stocks in SA-4. Space does not permit a listing of all proposals for modifications to the various quota regulations. Only the proposals for major changes in the regulations are listed.

Table B23

ACTIVITY	1972 - 1973				
	UNITED STATES		CANADA		
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
TOTAL CATCH (in metric ton round weights)	70,157 (m.t.)	13,491 (m.t.)	\$2,141 (m.t.)	\$99,341 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Proposal for international regulation of fishing gear used in SA-5 2. Proposal for termination of 10% Annual Extinction Program 3. Comprehensive proposal for rational allocation of all species in SA-5 4. Proposal for an overall reduction in total catch in SA-5 and 6 5. Proposal for complete closure of HADDOCK fishing (except for small by-catch) 6. Proposed method of regulation of legal fishing effort in SA-5 and 6 7. Proposal for two tier quota system		1. Quota regulations for HERRING off of Georges Bank and MACARELL in Southern New England 2. Alternate scheme for HERRING size limit exemption to a 25% by count per trip or 10% by weight per trip 3. Catch quota control for POLLOCK in SA-4 and 5	1. Quota regulation of HERRING in SA-4 2. Proposal for closure of HADDOCK fishing (except for small by catch) 3. Quota regulation of COO in SA-4	
SCIENTIFIC RESEARCH IN THE SUBAREA	1. HADDOCK - length and age composition 2. Population studies on all species including total fish biomass 3. HERRING - larval studies and underwater studies of spawning 4. YELLOWTAIL FLUNDER - length and age composition 5. GROUNDHOG - larval studies	1. Trawl survey on Scotian Shelf		1. GROUNDHOG - population estimates 2. HERRING - sampling of commercial catches 3. Hydrographic plankton in oceanic studies 4. HERRING - larval survey 5. SALMON - troll fishing	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. Proposed method of spacing by HERRING reported in observer and within the Commission for the numbers within the data document available 2. STACTIC - 4 U.S. proposed diving expecting officers authority to detain vessels a. U.S. Proposed reporting requirement on returns on infringements b. U.S. proposed exemption of Joint Enforcement Scheme to Statistical Area 6	3. U.S. submitted data regarding Comprehensive Management Scheme for all SA-5 fisheries. Data included requirements for catch sampling, effort monitoring, standard mesh size, reporting of discards and by catches, standardized logbook, and directed by inspectors. 4. Proposed resolution concerning separation of Statistical Data Base	1. Proposal regarding regulation of developing fisheries 2. Proposal to prohibit discards of regulated species 3. Four proposals for regulation of COO in SA-2 and 3		

ACTIVITY	UNITED STATES			CANADA			SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
	Subarea 5		Subarea 4	Subarea 5		Subarea 4	
	278,022 (m.t.)		12,794 (m.t.)	52,097 (m.t.)		595,369 (m.t.)	
TOTAL CATCH (in metric ton weight)	1. Amend HADDOCK regulations to allow incidental catch not to exceed 10% by weight on board on a trip by trip basis instead of period of 12 months. 2. First five species included: 17 species — COD, HADDOCK, REDFISH, SILVER HAKE, RED HAKE, YELLOWTAIL, FLUNDER, HERRING, SQUID ... 3. Restriction on fishing gear in Subarea 5 and Statistical Area 5 4. U.S. proposed a reserve special treatment in regard to 1975 squid fish quota. The reserve would increase an increase due to her special status in regard to S.S.S.			1. Amend incidental catch regulations as per Subarea 5 proposed.			1. As an alternate to HERRING size limitations, regulate according to 10% by weight on an annual basis of catch or 75% by count on a trip basis.
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. MACKEREL — stock assessments 2. HERRING — larval survey 3. Cooperative U.S.-USSR hydroacoustic experiment 4. GROUNDFISH — surveys 5. Four clam studies 6. HERRING — underwater studies spawning 7. RED HAKE — stock assessments 8. SILVER HAKE — stock assessments 9. COD — stock assessments 10. HERRING — stock assessments 11. YELLOWTAIL — stock assessments 12. SQUID — stock assessments			1. COD — food and spawning studies 2. Environmental studies — regarding surface temperature 3. HADDOCK — spawning studies 4. SILVER HAKE — food studies 5. HADDOCK — food studies 6. POLLOCK — spawning studies			1. GROUNDFISH — assessment studies 2. Acoustic and trawling surveys in 1975 3. HERRING — studies of larvae in Bay of Fundy 4. HERRING — tagging studies
SCIENTIFIC RESEARCH IN THE SUBAREA	1. The two fish catch quotas on HERRING and SQUID came into effect in S.A.S. and Statistical Area 5. 2. Fishing gear, area and season restrictions in S.A.S. in effect. 3. U.S.-CA proposed revisions to Joint Enforcement Scheme			1. Proposal regarding monthly reporting of catch of stocks subject to quota regulation 2. Canada notes that two tier quota system is not needed in SAs 2, 3 and 4, because the stock intermingling problem is not as acute as it is in SAs 5. Canada proposed to bring additional stocks in Subarea 2, 3 and 4 under quota regulation 3. U.S.-CA — proposal remains to Joint Enforcement Scheme			
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION							

1974 - 1975					
ACTIVITY	UNITED STATES		CANADA		
	Subarea 5	Subarea 4	Subarea 5	Subarea 4	SIGNIFICANT ACTIONS BY 3RD PARTIES IN THE CONVENTION AREA
TOTAL CATCH (in metric ton round weight)	238,269 (m.t.)	17,845 (m.t.)	62,060 (m.t.)	98,747 (m.t.)	
MANAGEMENT PROPOSALS WITHIN THE PANEL AFFECTING STOCKS IN THE SUBAREA	1. Regulations designed for greater overall adherence to the Commission's regulations. 2. Incidental catch allowances for HADDOCK, not to exceed 15% of catch aboard or 2,500 lbs. 3. Closure of Georges Bank for all vessels over 130 ft. using demersal gear for entire year. 4. Reduction of HERRING allocations. 5. Allocations for YELLOWTAIL TOUNDER. 6. Proposal for regulation of fishing gear in SAS.			1. Extend closed area/season regulations to reduce HADDOCK catch. 2. HADDOCK — breach and to exceed 2,250 kg or 10% by weight of all other fish. 3. Quota regulation for COD and HADDOCK in Subarea 4.	
SCIENTIFIC RESEARCH IN THE SUBAREA	1. Commercial sampling of all species of commercial importance. 2. Gear trials. 3. GROUNDFISH — surveys. 4. Macrobenthic surveys. 5. Zooplankton and juvenile fish survey. 6. Sea surface temperature survey by infrared. 7. HADDOCK — biological studies. 8. Food habits of 20 species. 9. HERRING — manned, underway research, spawning and egg dynamics. 10. COD — biological survey. 11. POLLOCK — biological survey. 12. YELLOWTAIL — biological survey.	1. Studies of spawning and fecundity of important fish species. 2. GROUNDFISH — surveys in 41. 3. Plankton and hydrographic surveys in 41.	1. SEA SCALLOPS — sampling for mesh size studies. 2. HERRING — movements in the Bay of Fundy.	1. Hydrographic and plankton studies in the Gulf of St. Lawrence and on the Scotian Shelf. 2. GROUNDFISH — stock assessment. 3. Commercial sampling of fisheries. 4. Experimental development of acoustic counting techniques. 5. Egg and larval study in 41. 6. HERRING — tagging of approximately 35,000 in Bay of Fundy. 7. MACKEREL — tagging of 11,000 in 41WWS. 8. Pelagic fish stock assessment.	
OTHER SIGNIFICANT ACTIVITIES WITHIN THE COMMISSION	1. Proposal for improved statistical reporting. 2. US-CA proposal for management of quota allocations. 3. Proposal for national licensing of fishing vessels. 4. U.S. proposed additional decrease for 1975 overall second tier quota in SAS, with an increase in U.S. second tier quota due to special relationship of U.S. to SAS stocks.		1. Proposal regarding national allocations of total allowable catch. 2. U.S.-CA proposal for management of quota allocations. 3. Proposal for a reduction in fishing effort in SAS 2, 3, and 4.		

Appendix A to Annex 3

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HANDBOOK, 1978

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Appendix C1 to Annex 3

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Volume III

Annex 4

A FACTUAL ANALYSIS OF THE SOCIO-ECONOMIC ARGUMENTS
IN THE CANADIAN MEMORIAL*

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INTRODUCTION

1. The United States demonstrates in Part II of its Counter-Memorial that considerations of economic dependence and relative wealth are, as a matter of law, irrelevant to the delimitation of maritime boundaries¹. In this Annex, the United States demonstrates further that the socio-economic arguments adduced by Canada in its Memorial are based upon incomplete or selective economic data, resulting in a misleading analysis. When fully considered and properly analyzed, the socio-economic facts, even if they were relevant, do not support the Canadian line.

2. Canada emphasizes the "present and prospective economic importance" of fishing on Georges Bank to the Parties, while proposing that the Court split the Bank². Canada thereby would have the Court ignore the historic predominant interest of the United States in Georges Bank. Moreover, Canada's description of the "contemporary" fishing activities of the Parties on Georges Bank³, which is based upon the unrepresentative ten-year period 1969 through 1978, is incomplete and misleading. That description understates the current fishing activities of the United States.

3. Canada exaggerates the contribution that fishing on Georges Bank makes to its economy. Fishing on the northeastern portion of Georges Bank does not make a significant contribution to the economy of Canada as a whole, representing a direct contribution, in 1980, of only 0.011 per cent of total Canadian employment and 0.018 per cent of total Canadian gross domestic product. Even in terms of the economy of Nova Scotia, the direct contribution of that fishing is not great, amounting only to 0.4 per cent of employment and 0.7 per cent of gross domestic product. The contribution of that fishing to the economies of a few communities in southwest Nova Scotia, while not approaching that suggested in the Canadian Memorial, is more significant. The actual employment generated directly by fishing on the northeastern portion of Georges Bank in 1980 was approximately 1,100 full-time-equivalent man-years.

4. Finally, Canada presents incomplete and inaccurate analyses of the economies of Nova Scotia and southwest Nova Scotia and of the

¹ United States Counter-Memorial, Part II, Chapter II, Section 1.

² Canadian Memorial, para. 319.

³ Canadian Memorial, paras. 122-148.

alternatives to fishing on Georges Bank available to Nova Scotia. The economy of Nova Scotia, as a whole, is more developed and diversified, and the standard of living there is higher, than Canada suggests in its Memorial. Alternatives to fishing on Georges Bank do exist, both in the fishing industry itself and in the economy of Nova Scotia at large, particularly with respect to its developing offshore oil and gas industry.

CHAPTER I

CANADA'S DESCRIPTION OF THE FISHING ACTIVITIES OF THE PARTIES ON GEORGES BANK IS INCOMPLETE AND MISLEADING

5. In describing the fishing activities of Canada and of the United States on Georges Bank, Canada uses data from an extraordinary and unrepresentative period, the years 1969 through 1978¹. Canada asserts that this period has been selected because it is:

"... long enough to convey a representative picture that avoids distortions resulting from short-term fluctuations, yet short enough to focus attention upon the contemporary reality of the fishery".

(139) 6. The period chosen by Canada is not, in fact, representative of either historic or current fishing patterns on Georges Bank². On the contrary, that period exaggerates the fishing activities of Canada and understates the fishing activities of the United States on Georges Bank. Figure 1 illustrates the relative shares of the combined total of United States and Canadian catches on Georges Bank from 1940 through 1981. As Figure 1 indicates, there was no fishing on Georges Bank by Canada until 1954. The small Canadian share of the combined catch increased slowly until the early 1960s. In the mid-1960s, the Canadian catch rose dramatically. The United States catch relative to the Canadian catch reached a low point in 1968, but subsequently has increased, particularly since 1978. The period of 1969 through 1978 chosen by Canada concentrates on an interval during which the United States catch was temporarily diminished.

¹ Canadian Memorial, paras. 122, 124, 128, 129, 132-134, 136, 138, 139, and 141.

² Canadian Memorial, para. 122.

³ The level of fishing activities by the Parties during this period of 1969 through 1978 reflects a number of unusual events. These include the vessel construction subsidy and fish-price support programs of the Canadian Government, effects of heavy foreign fishing on Georges Bank, the depletion of the scallop resources of the northeastern portion of Georges Bank, and the extension of exclusive fishing jurisdiction to 200 nautical miles in 1977. See United States Memorial, paras. 80-88; United States Counter-Memorial, paras. 67-76.

7. The pattern is even more striking with respect to scallops, the species on Georges Bank that is of the greatest interest to Canada¹. Figure 2 shows that the so-called "representative period" ignores both the predominant interest of the United States in that fishery in the decades prior to the early 1960s, and the resurgence of United States participation in that fishery beginning in the mid-1970s and continuing to the present. The return to the traditionally larger role for the United States vis-à-vis Canada in the Georges Bank scallop fishery—including the fishery in the northeastern portion of the Bank—is confirmed, for example, in 1981, the last year for which final statistics are available, when the United States caught 51 per cent of the total catch, or more than twice its average share for the years 1969 through 1978².

(139) (140) 8. As these Figures show, the relative catches from Georges Bank of the two Parties differ, depending upon the period chosen for analysis. A longer period, such as the period from 1940 to the present, provides a more accurate picture of the historic fishing activities of the Parties on Georges Bank. A more recent period, such as the latest year or the latest four or five-year period, provides a more accurate description of the current fishing activities of the Parties on the Bank³.

9. Although use of data from the period of 1969 through 1978 to describe contemporary activities on the northeastern portion of Georges Bank is misleading, use of data from the year 1978 alone is even more deceptive⁴. That year was highly unusual because of the exceptional abundance of high-value stocks (scallops, cod, and haddock) on Georges Bank and because of the extraordinary effort undertaken by nationals of each Party to catch those stocks. For example, the Canadian scallop catch on Georges Bank, in 1978, was 41 per cent higher in terms of weight than was the average of the Canadian catch during the three years preceding and following 1978⁵. Canada's total catch on Georges Bank in 1978,

¹ Canadian Memorial, e.g. paras. 113, 129, and 134.

² This calculation is based upon Appendix E, Table 2.

³ Complete data are available for the years 1977 through 1980 in the ICNAF-/NAFO *Statistical Bulletins*. Data for 1981 are available only at aggregate levels (catch by species by subarea by State), in "Provisional Nominal Catches in the Northwest Atlantic", 1981, NAFO SCS Doc. 82/VI/7.

⁴ Canadian Memorial, paras. 113, 127, 129, 145, 147, 150, 151, 155-157, and 160.

⁵ Canada caught 12,189 metric tons of scallops in 1978. The average Canadian scallop catch in Subarea 5Ze for the years 1975 through 1977 and 1979 through 1981, combined, was 8,675 metric tons. This calculation is based upon Appendix E, Table 2. Unless otherwise indicated, scallop catch is measured throughout this Annex in meat weight. See United States Memorial, para. 83, n. 4. Canada also uses meat weight to measure scallop catch in its Memorial. Canadian Memorial, para. 133.

measured on the same basis, was 57 per cent higher¹. Nonetheless, Canada repeatedly uses data from this highly unusual year in its Memorial.

¹ The total Canadian catch in Subarea 5Ze in 1978 was 37,287 metric tons. The average Canadian total catch in Subarea 5Ze for 1975 through 1977 and 1979 through 1981, combined, was 23,697 metric tons. This calculation is based upon Appendix E, Table 1. In this regard, *see* United States Counter-Memorial, Annex 18, Vol. V, which demonstrates the large increases in the Canadian groundfish catches on the northeastern portion of Georges Bank in the period of 1977 through 1978.

CHAPTER II

CANADA EXAGGERATES THE CONTRIBUTION OF FISHING ON GEORGES BANK TO THE ECONOMY OF NOVA SCOTIA

10. Throughout its Memorial, Canada makes numerous statements about the contribution of fishing to the employment and to the gross domestic product of Nova Scotia. Those descriptions are misleading in two respects. First, Canada alludes repeatedly to the amount of employment or gross domestic product¹ (hereinafter GDP) generated by all fishing activities by the inhabitants of Nova Scotia or southwest Nova Scotia, rather than to that generated by fishing on the northeastern portion of Georges Bank alone². Second, Canada compares even that employment or GDP only to specific sectors of the economy, and never to the entire economy of Nova Scotia or to that of Canada as a whole. Thus, nowhere in its Memorial does Canada quantify the contribution that fishing on Georges Bank makes to total employment or GDP at either the provincial or national level.

¹ Gross domestic product (GDP) is a measure of the total flow of goods and services provided by an economy over a particular period of time, normally a year. GDP measures both the total output of goods and services and the total income earned by the factors of production. One way in which to obtain the value of GDP is to add the receipts or income of all factors of production, including the wages of all workers, the profits of all business owners, the rents of all landowners, etc. Another way of obtaining the value of GDP is to add the values of the outputs of all goods and services. To avoid counting these values more than once, outputs that are sold to other industries are excluded from the sum. The payments to factors of production by an industry are termed "value added" or "GDP originating" in that industry. Thus, the contribution of an industry to GDP is measured by its value added.

² For analytical purposes, it is useful to separate the employment and income generated by fishing on the northeastern portion of Georges Bank into two categories: income and employment directly generated in the fishing industry by fish harvesting and fish processing, and employment and income indirectly generated by such activities. Employment and income indirectly generated includes employment and income generated by sales of goods and services to the fishing industry, and employment and income induced when personal income generated directly and indirectly is respent in the economy.

SECTION 1. Canada Exaggerates the Contribution of Fishing on Georges Bank to Employment

11. Canada asserts that:

"In 1978, fishing was the clear leader in *primary sector employment* in Nova Scotia as a whole . . .¹".

An accompanying table indicates that fishing constituted 36 per cent of the "Primary Sector Employment" in the Province of Nova Scotia ².

12. These statements are examples of two common shortcomings in Canada's economic analysis. First, they describe the contribution to employment of all fishing activities by the inhabitants of the Province, and not just the contribution of fishing on Georges Bank. Second, these statements limit the analysis to the contribution of fishing to employment in only one sector of the economy of Nova Scotia, and not to the economy as a whole.

13. The primary sector is only one of three sectors into which an economy can be divided for purposes of economic analysis. The primary sector includes those economic activities that produce raw materials, such as mining, forestry, and fishing. The other two sectors are the manufacturing sector, which includes those economic activities that process raw materials and transform them into finished products, and the service sector, which includes those economic activities that produce services rather than material goods. An accurate assessment of the contribution of a particular activity to an economy should include an analysis of that contribution in terms of the economy as a whole, including all three sectors. Nonetheless, Canada repeatedly analyzes the contribution of the fishing industry in Nova Scotia to just one sector of the economy. For example, in regard to fish processing, Canada asserts:

"In the province of Nova Scotia as a whole, *fish processing* led all other *manufacturing industries* in terms of employment in 1978, accounting for about 15 percent of total *manufacturing employment*—a level about twice as great as that of the provincial pulp and paper industry ³."

14. Canada does not quantify the contribution that fishing on Georges Bank makes to total employment in Canada, in the province of Nova Scotia, or even in southwest Nova Scotia. The United States estimates that Canadian fishing on the northeastern portion of Georges Bank

¹ Canadian Memorial, para. 150. [Emphasis added.]

² *Ibid.*, Table 2.

³ Canadian Memorial, para. 160. [Emphasis added, citation omitted.]

directly generated, in 1980, approximately 1,100 full-time-equivalent man-years, 591.0 in the primary sector by fish harvesting and 487.8 in the manufacturing sector by fish processing ¹. These approximately 1,100 full-time-equivalent man-years amounted to 0.011 per cent of total Canadian employment (Figure 3) and to 0.4 per cent of employment in Nova Scotia (Figure 4) in that year ².

15. Canada also argues that Canadian fishing on Georges Bank indirectly generates significant employment in addition to that generated directly by fish harvesting and fish processing ³. For example, Canada contends:

"It is estimated that in the manufacturing sector alone, businesses that are wholly or substantially dependent on the fishing industry account for roughly 5 percent of total area employment. As well (through the available statistical information does not permit a quantitative estimate), there is obviously a considerable amount of indirect employment generated in the many firms that sell supplies or provide services to the fishing industry ⁴."

In discussing the contribution of fishing to the economy of Nova Scotia, Canada asserts:

"Thus, without even counting its role in sustaining the broader economy, including the dependence of non-manufacturing businesses that provide services and supplies to the industry, the fishery generates about one-fifth of all employment in southwest Nova Scotia ⁵."

16. Once again, Canada directs its analysis to "the fishery" in general, and does not quantify the employment generated outside the fishing industry in Nova Scotia by fishing on Georges Bank. The United States estimates that fishing on Georges Bank generated, in 1980, an additional 643.8 full-time-equivalent man-years of indirect employment in all sectors

¹ Appendix B, Section 1, Table 2. The year 1980 is the most recent year for which the necessary data are fully available. *See* Appendix B, Introduction.

² For purposes of this analysis, a full-time-equivalent man-year was treated as a full-time employee. Canada, in its Memorial, conducts a similar analysis. Para. 171. Fishing on the northeastern portion of Georges Bank generated very nearly the same employment in the United States. Such fishing during 1980 directly generated close to 900 full-time-equivalent man-years; 429.9 full-time-equivalent man-years in fish harvesting and 452.9 in fish processing. *See* Appendix B, Section 1, Table 3.

³ Canadian Memorial, paras. 165-169.

⁴ Canadian Memorial, para. 165. [Citation omitted.]

⁵ Canadian Memorial, para. 169.

of the economy of Nova Scotia¹. Thus, the total employment, both direct and indirect, generated in Nova Scotia by fishing on the northeastern portion of Georges Bank is approximately 1,700 full-time-equivalent man-years, or about 0.018 per cent of total Canadian employment and 0.60 per cent of employment in Nova Scotia².

17. In describing the contribution of its fishing on Georges Bank to employment, Canada draws a comparison between southwest Nova Scotia, on the one hand, and Iceland and Norway, on the other³. A comparison between similar political and economic units would relate Iceland or Norway to all of Canada, not merely to southwest Nova Scotia. Fish harvesting and fish processing, on a nationwide basis, represented only 1.1 per cent of employment in Canada⁴, compared to 15 per cent in Iceland⁵ and to 2 or 3 per cent in Norway⁶. Fishing and fish processing associated with Georges Bank directly contributes only 0.011 per cent of employment in Canada.

¹ Appendix B, Introduction, Table 1. The United States estimates that fishing on the northeastern portion of the Bank by United States nationals in 1980 generated 617.1 full-time-equivalent man-years of indirect employment. Appendix B, Introduction, Table 2.

² These calculations are based upon Appendix B, Introduction, Table 1, and Appendix A, Table 1. The total employment, both direct and indirect, generated in the United States in 1980 by fishing on the northeastern portion of Georges Bank is approximately 1,500 full-time-equivalent man-years. Appendix B, Introduction, Table 2.

³ Canadian Memorial, paras. 173 and 174.

⁴ Canada makes this comparison for the year 1979, based upon statistics contained in Canadian Fisheries, *Annual Statistical Review*, 1980, Vol. II, Table 16.

⁵ Canadian Memorial, para. 173. The United Kingdom conceded, in its case before the International Court of Justice challenging Iceland's attempt to extend its exclusive fishing jurisdiction to a distance of 50 miles from its coasts, that Iceland was more economically dependent upon her coastal fisheries than any other independent State. *I.C.J. Pleadings, Fisheries Jurisdiction*, Vol. I, p. 33.

⁶ Canada also makes a comparison between Nova Scotia and northern Norway, in which Canada contends that 10 or 15 per cent of the employment depends upon fishing. Canadian Memorial, para. 174. In 1951, when the United Kingdom challenged Norway's assertion of exclusive jurisdiction over its coastal fisheries before the International Court of Justice, Norway argued that one-half the adult male population in northern Norway and 70 to 80 per cent in the coastal region were engaged in fishing. *I.C.J. Pleadings, Fisheries*, Vol. II, p. 13. The United Kingdom, moreover, asserted that 85.6 per cent of the adult population of the area was dependent upon the fisheries. *I.C.J. Pleadings, Fisheries*, Vol. I, p. 112. This compares to the 0.4 per cent of Nova Scotia's employment directly generated by fishing on Georges Bank. Appendix B, Section 1, Table 2.

SECTION 2. Canada Exaggerates the Contribution of Fishing on Georges Bank to Gross Domestic Product

18. Canada argues that fishing on Georges Bank is important to the economy of Nova Scotia and yet analyzes the contribution of all fishing activities by inhabitants of the Province to the GDP of Nova Scotia. Canada asserts:

"Fishing and mining are the two main *primary sector* contributors to the gross domestic product of Nova Scotia as a whole. In some years *fishing* leads *this sector* of the provincial economy, as it did in 1978 . . . Though mining often ranks ahead of *fishing* as a contributor to provincial gross domestic product *in the primary sector* (especially when fish prices are low), there are no significant mining developments in southwest Nova Scotia. Agriculture, moreover, is a marginal sector in this part of the province, mainly because of poor soils. Forestry, on the other hand, does make a significant contribution to the economy of the five southwestern countries (though largely through processing rather than primary production); but it is one that ranks far behind fishing in regional importance¹."

Canada later states that fishing and fish processing together make up about 15 per cent of GDP in the "goods producing sector" of the Province².

19. Canada again has described the contribution of all fishing by the inhabitants of the entire province, rather than of fishing only on Georges Bank. Moreover, Canada analyzes that contribution in terms of the primary and manufacturing sectors of the economy alone, ignoring completely the largest sector of the Nova Scotia economy, the service sector. In 1978, the service sector contributed 71.5 per cent of the total Nova Scotia GDP³.

20. All fish harvesting and processing in Nova Scotia contributed directly, in 1980, approximately 0.12 per cent of Canada's GDP⁴ and 5.3 per cent of Nova Scotia's GDP. By contrast, fish harvesting and processing associated with Georges Bank alone contributed only 0.018 per cent of Canada's GDP and 0.7 per cent of Nova Scotia's GDP. See Figures 5 and 6.

¹ Canadian Memorial, para. 151. [Emphasis added.]

² Canadian Memorial, para. 168.

³ Appendix A, Table 2.

⁴ This calculation is based upon Appendix B, Section 1, Table 2a.

SECTION 3. Canada Exaggerates the Contribution of Fishing on Georges Bank to the Economy of Southwest Nova Scotia

21. Canada suggests that fishing on Georges Bank is vital to the economic survival of southwest Nova Scotia. Canada argues:

"Clearly, Georges Bank may be described as the keystone of the regional fishery. By the same token it is an indispensable ingredient in the general economy of southwest Nova Scotia in which the fishery plays so fundamental a role¹."

Canada proceeds to describe the "essential" nature of that fishery:

"For many of the smaller ports of the region as well, Georges Bank makes an essential contribution. Many of the small offshore vessels based in the villages scattered along the extreme southwestern end of Nova Scotia—Shelburne, Yarmouth and Digby counties—rely on eastern Georges Bank for a significant proportion of their landings of cod, haddock and other groundfish species, especially during the summer months when the weather makes for relatively safe conditions on the offshore banks. The processing of these groundfish landings is a labour-intensive activity, carried out locally at village fish plants that often provide the only available source of onshore employment²."

22. Canada provides only fragmentary landings statistics for 1978 to substantiate its assertions that "Georges Bank makes an essential contribution" to "the smaller ports of the region", and that the Bank contributes "a significant proportion of their landings"³. As previously noted, 1978 was an extraordinary year. Even in 1978, only one-quarter of the 285 "small offshore vessels" that Canada claims are especially dependent upon Georges Bank fished there at all⁴.

¹ Canadian Memorial, para. 115.

² Canadian Memorial, para. 116.

³ Canadian Memorial, paras. 145 and 147, and notes thereto.

⁴ Canadian Memorial, Annexes, Vol. IV, Annex 5, p. 92. This fleet, which Canada claims takes a "significant proportion" of its catch from Georges Bank, caught only between 5.7 and 13.1 metric tons of groundfish per vessel per year on Georges Bank for the period of 1977 through 1980. Appendix C. By contrast, one class of these small offshore vessels based in southwest Nova Scotia sampled in the *Costs and Earnings of Selected Fishing Enterprises—Nova Scotia 1981*, 44'11" draggers, caught an average of 144 metric tons of groundfish that year, while another class sampled, 60' draggers, caught an average of 459 metric tons. Moreover, Canada does not include in its "small offshore fleet" hundreds of smaller "inshore" boats. These boats accounted for 36 per cent of the groundfish landed in far southwest Nova Scotia in the period 1977 through 1980, but only 2.9 per cent of the groundfish taken by these boats was taken from Georges Bank. This amounts only to 1.0 per cent of all groundfish landings in far southwest Nova Scotia. Appendix C.

23. Nonetheless, Canada suggests that landings from Georges Bank are "indispensable" to the "survival and social cohesion" of entire stretches of the Nova Scotia coastline:

"Though much of the income generated by the fish processing industry is attributable to the industrial-scale plants of the area, smaller facilities in dozens of coastal villages have a social and economic importance that is less easily quantified. Entire stretches of coastline, especially at the far southwestern corner of the province, are characterized by a rural economy that is totally dedicated to the fishery as a way of life. These coastal villages depend on their local plants—and the fish that provide their raw material—for their survival and social cohesion. The income the plants provide is widely dispersed and crucial to the undiversified rural economies of these coastal areas. The smaller plants are often economically marginal enterprises, however, and every source of fish supply that is available to them—including the Georges Bank landings from the small boat fleet . . . must be regarded as indispensable¹."

Similarly, Canada asserts:

"For the smaller coastal villages of southwest Nova Scotia, the role of the fishery can only be properly appreciated in human rather than purely economic terms. In much of the area there is no other basic industry at all; and without the fishery dozens of villages and towns would simply cease to exist²."

24. Canada's description of the contribution of fishing on Georges Bank, as opposed to fishing generally, to the local economy of the smaller coastal villages and towns of southwest Nova Scotia rests upon the unsubstantiated assertion that:

"Many of these villages rely on Georges Bank for at least some of their landings, often for a significant proportion in the summer months when the small boat fleet described in paragraphs 143 to 148 is most active on the offshore banks²."

25. Contrary to Canada's contention, fishing on Georges Bank does not make a significant contribution to the economies of the coastal

¹ Canadian Memorial, para. 164.

² Canadian Memorial, para. 172.

towns and villages of southwest Nova Scotia¹. Even in 1978, only a handful of towns and villages along the southwest coast of Nova Scotia reported landings from Georges Bank amounting to more than 10 per cent in value of their total landings². Indeed, fishing and fish processing relating to Georges Bank are concentrated in just five larger ports—Lunenburg³, Riverport, Yarmouth, Saulnierville, and Liverpool⁴. Figure 7. The two leading ports, Lunenburg and Riverport, are located within 18 kilometers of each other and within a one-hour drive of Halifax⁵. These two ports together account for well over one-half of Canada's landings from the Bank⁶.

26. Landings from Georges Bank, in terms of value, are concentrated in these five ports, primarily because scallops comprise most of the Canadian landings from Georges Bank by value⁷. These scallops are caught by the larger vessels of the Nova Scotia offshore scallop fleet, which is concentrated in these five ports, primarily in the Lunenburg-Riverport complex⁸. In addition, much of Nova Scotia's offshore trawler fleet is also based in these five ports⁹.

¹ Most of the towns and villages of southwest Nova Scotia were established in the 18th and 19th centuries, long before Canadian fishermen began to fish on Georges Bank.

² Canadian Memorial, para. 156, Table 5. The value of those landings, however, should not be used to evaluate their contribution to the economy. That contribution is measured by the value added. See para. 10, n. 1, *supra*.

³ Lunenburg historically has been the leading port for the offshore fleet of Nova Scotia. United States Counter-Memorial, Annex 7, Vol. IV.

⁴ See Canadian Memorial, para. 156, Table 5.

⁵ Lunenburg is 91 kilometers (57 miles) by road from Halifax. Most of this distance is covered by a controlled-access highway. Nova Scotia Dept. of Tourism, *Official Highways Map* (distance charts).

⁶ Fisheries District 26 landed 60 per cent, in terms of value, of Canada's catch from Georges Bank for the years 1977 through 1980. This calculation is based upon Appendix E, Tables 11-14. See also Canadian Memorial, para 156, Table 5. All vessels from Fisheries District 26 that fish on Georges Bank are home-ported in Lunenburg or Riverport. See NAFO, *List of Vessels 1980*.

⁷ Canadian Memorial, para. 157. Scallops accounted for 63.08 per cent by weight and 82.43 per cent by value of the Canadian landings from Georges Bank during the period 1977 through 1980. These calculations are based upon Appendix E, Tables 11-14, and unpublished Canadian Dept. of Fisheries and Oceans landings data.

⁸ In terms of value, 63.8 per cent of the scallops taken from Georges Bank by Canada in the period 1977 through 1980 were landed in Fisheries District 26. This calculation is based upon Appendix E, Tables 11-14, and unpublished Canadian Dept. of Fisheries and Oceans landings data.

⁹ See NAFO, *List of Vessels 1980*.

27. The remaining towns and villages scattered along the coast of southwest Nova Scotia do not engage significantly in the offshore scallop fishery¹. Nor, apparently, do the small fish processing facilities located in these towns and villages process offshore scallops². To whatever extent the small towns and villages of southwest Nova Scotia rely upon Georges Bank fisheries, they do so solely with respect to groundfish and lobsters, and then only to an insignificant degree. This is true even in regard to the three far southwest counties (Shelburne, Yarmouth, and Digby) that Canada claims have a "significant" interest in Georges Bank³. The United States estimates that, during the years 1977 through 1980, less than 10 per cent of far southwest Nova Scotia's landings of groundfish, and six per cent of its landings of lobster, came from Georges Bank⁴. No evidence has been adduced by Canada to demonstrate that these small catches from Georges Bank are vital to the survival of the communities of this area.

SECTION 4. Conclusion

28. Fishing on the northeastern portion of Georges Bank contributes relatively little to the economy of Canada or to the economy of Nova Scotia. In 1980, it contributed directly only 0.018 per cent to the GDP for Canada and only 0.7 per cent to the GDP for Nova Scotia. It contributed directly about 1,100 full-time-equivalent man-years of employment⁵. Moreover, the bulk of the employment generated by fishing on Georges Bank is concentrated in a handful of ports. Finally, the landings from Georges Bank are not a significant factor in the economies of the other coastal towns and villages of southwest Nova Scotia.

¹ Under Canadian regulations, the inshore scallop fleet is permitted to take up to 2.9 per cent of the previous year's total offshore scallop catch from Georges Bank. *Fisherman's Information*, 1982, Fisheries and Oceans, p. 31.

² Canadian Memorial, para. 116 and Figure 29.

³ Canadian Memorial, para. 145.

⁴ These calculations are based upon unpublished landings data of the Canadian Dept. of Fisheries and Oceans and Appendix E, Tables 11-14.

⁵ The amount of employment and income generated by fishing on the northeastern portion of Georges Bank should not be equated with the economic effects that might occur in Nova Scotia following confirmation of United States jurisdiction over Georges Bank. These effects would diminish rapidly as the economy adjusted.

CHAPTER III

CANADA EXAGGERATES THE DIFFICULTIES IT WOULD ENCOUNTER IN ADJUSTING TO CONFIRMATION OF UNITED STATES JURISDICTION OVER THE NORTHEASTERN PORTION OF GEORGES BANK

29. Throughout its Memorial, Canada implies that it would encounter serious economic difficulties in adjusting to the confirmation of United States jurisdiction over the northeastern portion of Georges Bank. It suggests that the economy of Nova Scotia, and especially that of southwest Nova Scotia, is controlled by the physical environment of the region, and that this environment has limited, and will continue to limit, the ability of the economy of the region to develop and to diversify. Canada suggests further that this limitation results in a lower standard of living for Nova Scotia's inhabitants, and reduces Canada's alternatives to fishing on Georges Bank.

30. Physical environment did not compel the development of the Canadian fisheries on Georges Bank. Furthermore, the economy of Nova Scotia is more developed and diverse than Canada suggests, and the standard of living there is comparable with the rest of Canada and with much of the developed world. Finally, the fishing industry of Nova Scotia and the provincial economy at large are far more capable of adjustment than Canada suggests, particularly when Nova Scotia is about to benefit from rapid development of newly discovered offshore hydrocarbon resources.

SECTION 1. The Physical Environment Did Not Compel the Development of Canadian Fisheries on Georges Bank

31. Canada argues that the economic structure of Nova Scotia, particularly that of southwest Nova Scotia, is controlled by the physical environment. As Canada states:

"The 'Maritime Provinces' are aptly named. Here, in the converse of the legal maxim, the sea dominates the land. Nowhere is this more true than along the Canadian coasts that border the Gulf of Maine area, where the economy and the way of life are irrevocably tied to the resources of the sea¹."

¹ Canadian Memorial, para. 46.

Canada suggests that the predominance of fishing in the economy of Nova Scotia, particularly in southwest Nova Scotia, is a result of the physical environment. Canada describes that environment as follows:

"The most striking aspect of the pattern of settlement in southwest Nova Scotia is its overwhelmingly coastal character and the emptiness of the hinterland Well over a hundred of these settlements are historically linked to and currently dependent upon the fishery—often to the exclusion of virtually any other source of economic sustenance ¹."

32. The physical environment is one factor in shaping the economy of an area. Canadian government policy, however, was more important than was the physical environment in the development of the Canadian fisheries on Georges Bank.

A. PHYSICAL ENVIRONMENT DOES NOT DETERMINE THE SIZE AND STRUCTURE OF AN ECONOMY

33. In arguing that the physical environment shapes and limits the economy of Nova Scotia ², Canada relies upon a school of thought advocated during the 19th century, but largely abandoned in the 20th century. This school, known as the environmentalist or determinist school, held that mankind was subservient to the environment ³.

34. The environmentalist school is based upon the Malthusian concept that the ability of the physical environment to support the population of a region is relatively fixed, and that, at some point, that population may grow too large to be supported by that environment. The prevailing view today is that human potential is more important than environment in determining regional economic geography ⁴. Human needs can be satisfied through the redistribution of people or resources within or between regions. In addressing the interrelated issues of livelihood, resources, and welfare, attention must be paid to all the sources of development potential and adaptation available to a region—and not merely to the physical environment.

¹ Canadian Memorial, para. 48.

² See generally Canadian Memorial, paras. 29, 46, 48, 49, 56, 63, 152, 164, 172, and 202.

³ R. Hartshorne, "The Nature of Geography", in Assoc. of American Geographers, *Annals*, Vol. 29, 1939, pp. 296-302.

⁴ R. S. Platt, "Environmentalism Versus Geography", in *American Journal of Sociology*, Vol. 53, 1948, pp. 351-358; R. Hartshorne, *Perspective on the Nature of Geography*, 1959, pp. 39-40.

35. Indeed, the Atlantic Development Council of Canada, an advisory body established by the Canadian Government, rejected the view that environmental factors dictate the economic structure of an area:

"It is the Council's view that economic development occurs first in the minds of people, and that more efficient production and changes in economic structure to produce more sophisticated output are but reflections of a people's heightened perceptions of their condition and opportunity. Numerous peoples (e.g., in Holland, Japan, Israel, Switzerland) have shown that a rich endowment of physical resources is not the most basic requirement for the cultivation of human potential. It has been characteristic of Atlantic Canada that such structural economic changes as have occurred have been largely imposed from without rather than generated from within. In their state of dependence on the Canadian taxpayer at large and their heavy reliance for earnings on a relatively bountiful but poorly cultivated resource base, the people of the Atlantic Region are unlikely to experience acceleration in economic development unless they exercise the will and learn the skills to find a better combination of the political and economic factors at their disposal¹."

B. CANADIAN FISHING ON GEORGES BANK DEVELOPED IN RESPONSE TO GOVERNMENT POLICIES, NOT TO THE PHYSICAL ENVIRONMENT

36. In arguing that the physical environment has controlled the development of the economy of Nova Scotia, Canada contends:

"It is nature as much as history that has dictated this pattern of development in southwest Nova Scotia. The deeply indented coastline is ideal for small fishing harbours, but the land itself is stony and poor, and most of the soils in the five-county region are unsuitable for agricultural purposes. While the greater part of the region is covered with coniferous forest, the glacier-scraped terrain severely restricts productivity and forestry potential is limited. Only in eastern Digby county and parts of Lunenburg county does the land begin to offer greater agricultural promise²."

More specifically, with respect to fishing on Georges Bank, Canada argues that:

¹ Atlantic Development Council of Canada, *The Atlantic Region of Canada: Economic Development Strategy for the Eighties*, 1978, p. 228.

² Canadian Memorial, para. 49.

"... patterns of fishing on Georges Bank followed their natural course unconstrained by jurisdictional barriers".

37. Canada's assertions notwithstanding, Canadian fishing on Georges Bank is recent and results primarily from a variety of specific Canadian Government policies, and not from "natural" forces. These policies have encouraged the development of a fishery that previously had not existed, and, from the available evidence, that would not have developed to the same extent in the absence of those policies.

38. The Canadian Government has encouraged fishing on Georges Bank through a number of measures. These include: providing financial support to the fishing industry², such as generous vessel construction subsidies; limiting fishing by large scallop vessels to Georges Bank and other offshore grounds; and, effectively preventing vessels from Nova Scotia from exploiting underutilized fisheries off Newfoundland.

39. As previously noted, Canadian fishermen did not begin to take significant quantities of fish on Georges Bank until the 1960s. Thereafter, Canadian landings increased rapidly. This rapid increase was the result of the expansion, beginning in 1961, of a Canadian Government program for subsidizing the construction of new vessels. Under this expanded program, subsidies first amounted to \$250 per ton and later ranged up to 50 per cent of the cost of construction. Much of the remaining cost of the vessel could be financed with low-interest guaranteed loans³.

40. Although many types of fishing vessels were constructed under the program, its success is best reflected in the growth of the scallop fleet. In 1954, there were no Canadian scallop vessels capable of operating the year-round on Georges Bank. By 1960, there were nine such vessels, and by 1963—just three years later—there were 37⁴.

¹ Canadian Memorial, para. 122.

² In the period of 1974 through 1977, the Canadian Government provided over Can. \$150 million to the Canadian Atlantic fishing industry to prevent its collapse. The industry's crisis came as a result of overfishing, in large measure by foreign fleets. See Appendix D. The United States fishing industry received no comparable aid and many boats stopped fishing. This, in turn, affected the respective shares of the United States and Canada of the combined catch on Georges Bank, adding further to the unrepresentative nature of the period 1969 through 1978.

³ Appendix D.

⁴ Appendix D. The Canadian Government subsidy program was not limited to the Georges Bank scallop fishery, but was available to fishermen throughout the Maritime Provinces. Nevertheless, because of the resource conditions and ready access of the United States market, developed by United States fishermen, the scallop fishery was the major area of growth in the Maritime fisheries during the 1960s. United States Memorial, para. 82. See also Annex 19, Vol. V (Caddy and *footnote continued on next page*)

41. The effect of the subsidy program on Canadian fishing on Georges Bank may also be measured by the volume of that catch, both in absolute terms and relative to that of the United States. In the years from 1954 through 1963, the Canadian scallop catch on Georges Bank rose from 125 metric tons to 5,898 metric tons¹. In 1955, approximately 2.0 per cent of scallops caught on Georges Bank were taken by Canada; by 1964, nearly one-half of the total were taken by Canada¹.

42. In the late 1960s and early 1970s, Canadian scallop harvests on Georges Bank declined¹. Canadian scallop vessels began to fish in other areas and, in a few cases, for other species². Other Canadian fishermen, however, apparently objected to competition from those vessels. As a result, Canadian policy shifted from expanding the scallop fleet to preventing it from redirecting its efforts to other areas or species. For instance, in 1973, Canada limited the large-vessel scallop fleet to 72 vessels and restricted its operations to offshore banks³. This action prevented these vessels from shifting their effort to scallops in the Bay of Fundy and in other inshore waters⁴.

43. Thus, unlike the United States scallop fleet, which adapted "naturally" to changes in the abundance of the stock, either by moving to other areas or by switching to other species, the Canadian scallop fleet effectively was restricted to fishing for scallops on Georges Bank by Canadian Government policies.

SECTION 2. Canada Understates the Diversity of the Economy of Nova Scotia and the Standard of Living of Its Inhabitants

44. Throughout its Memorial, Canada suggests that Nova Scotia, particularly southwest Nova Scotia, has a one-dimensional, largely poor,

(footnote continued from the previous page)

Lord), p. 1; and N. Bourne, *Scallops and the Offshore Fishery of the Maritimes*, Fisheries Research Board of Canada, Bulletin No. 145, 1964, materials deposited by Canada pursuant to Article 50 (2) of the Rules of Court.

¹ Appendix E, Table 2.

² See United States Counter-Memorial, Annex 19, Vol. V (Caddy and Lord), p. 4.

³ Appendix D.

⁴ Even prior to 1973, the Canadian Government controlled access to the various inshore and offshore fisheries through a variety of government policies. These related, *inter alia*, to vessel and processing plant construction subsidy programs and quotas. The general effect of these programs has been to deny the Nova Scotia offshore fleet access to important groundfish stocks off Newfoundland. Appendix D.

rural, and fishery-based economy¹. In this regard, Canada asserts that Nova Scotia and the other Maritime Provinces in the Atlantic region "have not yet attained a level of prosperity and development comparable to the rest of Canada"².

45. Contrary to the Canadian assertions, the economy of Nova Scotia is neither one-dimensional nor poor³. Its economy is well-developed and diverse, and the standard of living in Nova Scotia, in many respects, is comparable with that of the rest of Canada, and that of much of the rest of the developed world.

A. THE ECONOMY OF NOVA SCOTIA IS NOT "ONE DIMENSIONAL"

46. Examination of the economy of Nova Scotia in terms of employment and GDP confirms the development and diversity of that economy⁴.

(14) 47. The manufacturing and service sectors, in 1980, accounted for 92.0 per cent of the total employment⁵ and 93.5 per cent of the GDP of Nova Scotia⁶. This large contribution by the manufacturing and service sectors reflects Nova Scotia's level of development and its full participation in the economy of a developed industrial nation⁷. Figures 8 and 9 illustrate the diversity within each of the three sectors of the economy of Nova Scotia. As these Figures show, fishing and fish processing associated with Georges Bank contributed directly only 0.4 per cent to employment and 0.7 per cent to the GDP in the province in 1980⁸. To borrow a phrase from the Canadian Memorial, fishing on Georges Bank, in terms of the overall economy of Nova Scotia, is "a drop in the proverbial bucket".

¹ See generally Canadian Memorial, paras. 62, 120, 143, and 169.

² Canadian Memorial, para. 110. [Citation omitted.]

³ In fact, the fishermen of southwest Nova Scotia are the most prosperous in all of Atlantic Canada, with an average income twice that of fishermen of the entire region. See Task Force on Atlantic Fisheries, *Navigating Troubled Waters (Highlights and Recommendations)* [hereinafter "Kirby Report"], Ministry of Supply and Services of Canada, 1982, pp. 13 and 28.

⁴ For a description of the economy of Nova Scotia, see Nova Scotia Dept. of Development, *Nova Scotia—An Introduction*, 1982.

⁵ Appendix A, Table 1.

⁶ Appendix A, Table 2.

⁷ In all of Canada these sectors accounted, in 1980, for approximately 90 per cent of both employment and of GDP. Figures 3 and 5.

⁸ Indirect employment and GDP generated by Canadian fishing on Georges Bank is estimated by the United States to be 643.8 full-time-equivalent man-years in employment, and \$28.2 million (U.S. 1972) in GDP. When these are included, the contribution of Georges Bank fishing to the economy of Nova Scotia rises to 0.6 per cent of employment and 1.7 per cent of GDP.

(footnotes continued on page 41)

B. THE STANDARD OF LIVING IN NOVA SCOTIA COMPARES FAVORABLY WITH THAT OF THE REST OF CANADA AND MUCH OF THE DEVELOPED WORLD

48. Standards of living may be evaluated through a variety of measures, including health care, education, housing, transportation, and GDP per capita. Based upon these measures, the standard of living in Nova Scotia is higher than that of the other Atlantic provinces of Canada, and is comparable with that of all of Canada. Furthermore, even when European States are included in the comparison, Nova Scotia enjoys a relatively favorable standard of living consistent with its full participation in a developed economy.

1. *Health Care*

49. In terms both of hospital beds and of physicians-per-person, Nova Scotia exceeds the Atlantic provinces and is comparable with that of all of Canada¹. Indeed, with respect to physicians, Nova Scotia exceeds Sweden¹, a State generally regarded as having one of the highest standards of living in the world. The infant mortality rate and the life expectancy rate of Nova Scotia are similar to those rates for all of Canada¹.

2. *Education*

50. Nova Scotia is comparable in its level of educational expenditures per student with the other Atlantic provinces, and with all Canada. The expenditures per student in Nova Scotia are comparable with those in the United Kingdom².

3. *Housing Quality*

51. The percentage of dwellings with indoor plumbing is a common measure of the quality of a State's housing stock. Nova Scotia's percentage is slightly lower than that for all of Canada, but is higher than that for some western European States, such as Belgium².

(footnotes continued from page 36)

⁹ Canadian Memorial, para. 177. In this regard, the economy of Nova Scotia relies far less upon fishing than do the economies of other parts of Atlantic Canada. Fishing and fish processing throughout Nova Scotia contribute only 5.4 per cent to employment in the Province. Figure 8. Fishing and fish processing throughout Newfoundland contribute 33.4 per cent to employment in that Province. Dept. of Fisheries and Oceans, *Annual Statistical Review*, 1980, Vol. 13, p. 34.

¹ Appendix F, Table 2.

² Appendix F, Table 1.

4. *Automobile Ownership*

52. The per capita automobile ownership rate for Nova Scotia is comparable with that for all of Canada and such western European States as the United Kingdom and Sweden ¹.

5. *GDP Per Capita*

53. The GDP per capita of Nova Scotia is less than that of all of Canada, which is among the world leaders in this measure of development. The GDP per capita of Nova Scotia does compare favorably, however, with that of other developed States, such as the United Kingdom, Austria, and Japan ².

54. In summary, the standard of living in Nova Scotia is generally comparable with that in all of Canada and in many other developed States.

SECTION 3. *Canada Has Alternatives to Fishing on Georges Bank*

55. Canada argues that, as a result of the constraints imposed by the physical environment, fishing is vital to the economy of Nova Scotia. In this regard, Canada suggests that it has no alternatives to fishing on Georges Bank, especially for scallops, with which to sustain and develop the economy of Nova Scotia, particularly that of southwest Nova Scotia ³.

56. As previously noted, however, fishing on Georges Bank directly generates only 0.4 per cent of the employment and 0.7 per cent of the GDP for Nova Scotia ⁴. Moreover, most economic activity associated with fishing on Georges Bank is concentrated in the Lunenburg-Riverport complex and a handful of other ports. While it is impossible to predict the future with certainty, both the fishing industry and the economy of Nova Scotia should continue to expand. As a result, the economy of Nova Scotia should be able to make adjustments in employment patterns in response to a confirmation of United States jurisdiction over the northeastern portion of Georges Bank ⁵.

¹ Appendix F, Table 1.

² Appendix F, Table 3.

³ See, e.g., Canadian Memorial, paras. 142, 146, and 159.

⁴ Appendix B, Section 1, Table 2.

⁵ In any event, a large portion of the Canadian scallop fleet is not presently engaged in fishing, because the availability of scallops on Georges Bank has declined in recent years. See Appendix E, Table 2. In a sense, the fleet already has adjusted from the unusually high-catch levels of the late 1970s. See, for example, Canadian press reports that the fleet "has given-up on Georges Bank". "Grand Banks Scallops Discovered In Survey", *Halifax Chronicle-Herald*, 14 Oct. 1982, p. 1.

A. CANADA HAS ALTERNATIVES WITHIN THE FISHING INDUSTRY TO FISHING ON GEORGES BANK

57. Canada has available to it alternative scallop grounds in the waters off Nova Scotia, albeit they are not as productive as the Georges Bank grounds¹. Canada's reliance on offshore scallop beds in ICNAF Subareas 3 (off Newfoundland) and 4 (off Nova Scotia) has increased sharply in recent years. In 1981, 26 per cent of Canada's scallop landings came from Subareas 3 and 4².

58. In addition, there are large stocks of cod and other groundfish located in waters off Nova Scotia and Newfoundland that presently are available to, but that are not being harvested by Canadian fishermen. The northern cod stock alone is expected to provide Canada, by 1987, with an additional 170,000 metric tons³. This is more than eight times the average yearly Canadian groundfish catch on the northeastern portion of Georges Bank during the years 1977 through 1981⁴.

59. The assertions in the Canadian Memorial notwithstanding⁵, Canadian studies and government documents indicate that "[t]he larger scallopers built since 1955 can be easily converted for groundfish dragging or longlining if the occasion arises"⁶. As noted by the Canadian Department of Fisheries:

"...the Nova Scotia scallop draggers can be converted to groundfish dragging, longlining, or even purse seining as required by the supply and demand situation"⁷.

¹ Canada Dept. of Fisheries and Oceans, *Assessment of Scallops on Browns and German Banks—1979*, Can. Tech. Rpt. of Fisheries and Aquatic Sciences No. 1014, 1981, p. 1. See also United States Counter-Memorial, Annex 1, The Marine Environment of the Gulf of Maine Area, paras. 94-95 and Figure 43.

² Northwest Atlantic Fisheries Organization, Scientific Council Meeting (June, 1980), SCS Doc. 82/VI/7, pp. 42 and 43.

³ Kirby Report, p. 91, reprinted at Annex 37, Vol. V. See also United States Counter-Memorial, Part III, Chapter III, Section 7.

⁴ During the years 1977 through 1981, the average groundfish catch was 19,473 metric tons. This calculation is based upon Appendix E, Table 3. See also United States Counter-Memorial, Annex 22, Vol. V, for a comparison of the Canadian catch on the northeastern portion of Georges Bank with the total Canadian catch in the Northwest Atlantic for the period 1977 through 1981.

⁵ Canadian Memorial, para. 142.

⁶ Bourne, *op. cit.*, p. 31.

⁷ Canada Dept. of Fisheries and Economic Services, *Trends in the Development of the Canadian Fisheries—Background Document for Fisheries Development Planning*, 1967, Supp. I, p. 22.

The scallop fleet appears particularly well-suited for conversion to automated long-liners, which then could fish offshore for cod and other groundfish¹. Such a conversion also would extend the useful life of the vessels².

B. NOVA SCOTIA HAS ALTERNATIVES WITHIN THE ECONOMY AT LARGE TO FISHING ON GEORGES BANK, PARTICULARLY IN REGARD TO THE DEVELOPMENT OF OFFSHORE OIL AND GAS

60. From the foregoing, it appears that much of any initial effect on employment that might result from the confirmation of United States jurisdiction over the northeastern portion of Georges Bank would be absorbed within the fishing industry itself. To the extent that any such effect was not absorbed within this industry, it would be absorbed by the economy of Nova Scotia at large. The development of the substantial hydrocarbon resources discovered on the continental shelf off Nova Scotia offers the most promising opportunity.

61. Nova Scotia is now on the brink of a "once-in-a-lifetime opportunity" arising from development of offshore oil and gas³. Since the successful exploratory drilling for offshore gas on the Venture field off Sable Island in 1979, the size of that field has been assessed with estimates ranging from 1,700 to 10,200 billion cubic feet of recoverable reserves, yielding 250 to 1,500 million cubic feet of natural gas daily⁴. Current activity indicates a major commitment by oil companies to develop that field and to explore for other resources:

"At present (early 1983) there are six drilling rigs in Nova Scotian waters. Three more are expected in 1983, and it seems reasonable to expect ten or more within five years (by 1987). The discovery of marketable quantities of gas by Mobil Oil has stimulated exploration by several other companies, including Shell, Husky and Petro-Canada. Each rig employs approximate-

¹ Kirby Report, p. 93, *reprinted at* Counter-Memorial, Annex 37, Vol. V.

² The offshore scallop fleet consists largely of older boats, most of which were constructed in the early 1960s. Scallop dragging puts heavy strain on the mechanical equipment and hull of the vessels, while long-lining is far less stressful, leading to a longer service life for the vessel.

³ Nova Scotia Dept. of Development, *Nova Scotia Benefits from Offshore Oil and Gas*, 1983, Introduction.

⁴ See United States Counter-Memorial, Annex 6, for a discussion of oil and gas potential on the Scotian Shelf.

⁵ Thorne Stevenson & Kellogg and Gardner Pinfold [hereinafter "Thorne Stevenson, et al."], *Scotian Shelf Gas Development: The Economic Impact on Nova Scotia*, Vol. 2, Report, prepared for Nova Scotia Dept. of Development and Dept. of Mines and Energy, and Canada Dept. of Regional Economic Expansion, 1981, Exhibit II-1, p. 4.

ly 200 people, with more jobs ashore and in supply vessels. By itself, this activity generates a wide range of business opportunities¹."

62. A report prepared for the Government of Nova Scotia estimates that the oil and gas industry will generate directly between 3,933 and 6,650 man-years of employment in the development phase². Nova Scotians are expected to fill about 40 per cent of these jobs³. It is estimated that five hundred to 1,100 man-years will be generated in the production phase, of which 90 per cent are expected to be filled by Nova Scotians⁴. Indirect and induced employment generated directly by the development of offshore oil and gas will generate thousands of additional employment opportunities in Nova Scotia⁵.

63. Total income generated in Nova Scotia during the development phase is estimated to range from \$86 million (1980 Can.) to \$262 million, and during the production stage, from \$32 million to \$152 million per year⁶. It is estimated that direct income to Nova Scotia households during the production phase generated by local employment and purchases alone will contribute between \$16 and \$80 million per year in the early 1990s⁷.

64. Thus, the number of jobs expected to be generated by offshore oil and gas development alone in the next few years far exceeds the 1,700 full-time-equivalent man-years of total employment generated in Nova Scotia by fishing on Georges Bank. Fishermen are familiar with the demands of work at sea and are well suited for the offshore oil and gas industry. Indeed, the report prepared for the Government of Nova Scotia suggests that offshore oil and gas development will attract individuals presently engaged in fishing, possibly creating a shortage of trained fishermen⁸.

65. Although the development of the oil and gas resources of the Scotian shelf offers the brightest, most immediate prospects for alternative employment, continued general economic development within Nova

¹ *Nova Scotia Benefits from Offshore Oil and Gas*, *supra* para. 61, n. 3, p. 1.

² Thorne Stevenson, *et al.*, Exhibit VI-2, p. 52.

³ *Ibid.*, p. 51.

⁴ *Ibid.*, p. 10.

⁵ Using input-output analysis, the Thorne Stevenson study estimated that the Venture field gas project will generate between 4,000 and 13,000 man-years of employment in Nova Scotia during the development phase, and between 2,000 and 9,000 man-years in the subsequent production phase. *Ibid.*, Exhibit VI-4, pp. 57-58.

⁶ Thorne Stevenson, *et al.*, Exhibit VI-4, pp. 57-58.

⁷ *Ibid.*, Exhibit VI-3, p. 53.

⁸ *Ibid.*, p. 64.

Scotia offers additional opportunities. For example, there is significant potential for expansion of the agricultural sector¹. Manufacturing also is expected to generate economic growth in Nova Scotia.

66. Recently, the Nova Scotia Department of Development acknowledged the broad range of opportunities generally available in Nova Scotia in the manufacturing sector:

"Based upon an assessment of Nova Scotia's competitive strengths and weaknesses, we appear to have significant manufacturing opportunities in plastics fabrication, in chemicals extracted from marine plants, in drug, personal and home care industries, in defence-related manufacturing, and, on a smaller scale, in certain industrial chemicals, and home and commercial furnishings. There are undoubtedly many others²."

67. This broad range of opportunities in the manufacturing sector was also recognized by a consultant to the Department of Development, who concluded:

"An expanded manufacturing sector would help Nova Scotia meet its future employment needs and provide it with a stronger, more balanced economy."

DOD's latest projections show the addition of 6,000 manufacturing jobs over the next ten years. These projections are based on special events that may not be repeated, such as the fortuitous decision by Michelin, and the recent rapid growth of forestry processing.

However, we think that Nova Scotia can and should increase manufacturing employment by about 20% over the next decade, even surpassing present projections, through rigorous pursuit of the directions provided in this report³."

68. In addition, the service sector continues to offer a wide assortment of opportunities. Finance, insurance, and real estate have been the fastest growing areas in Nova Scotia, followed by wholesale and retail trade, transportation, communications, and utilities⁴.

¹ Nova Scotia Dept. of Development, *Toward an Economic Development Strategy for Nova Scotia*, 1980, pp. 13-14.

² *Ibid.*, p. 29.

³ The Canada Consulting Group, *Industrial Opportunities for the 1980's and 1990's* (unpublished report for use of Nova Scotia Dept. of Development), 1979, p. 2.

⁴ The Conference Board in Canada, *The Provincial Economies*, Part II: Key Economic Indicators—Annual Tables, Tables 4.3.1-2, pp. 48-49. Tourism is also an important source of employment and income in Nova Scotia, and has the potential for further growth. *Toward an Economic Development Strategy for Nova Scotia*, *supra* para. 65, n. 1, pp. 12, 19-21.

Appendix A to Annex 4

EMPLOYMENT AND GROSS DOMESTIC PRODUCT IN CANADA AND NOVA SCOTIA

[Not reproduced]

Appendix B to Annex 4

EMPLOYMENT AND GROSS DOMESTIC PRODUCT GENERATED IN CANADA AND IN THE UNITED STATES BY FISHING ON THE NORTHEASTERN PORTION OF GEORGES BANK

(This Appendix was prepared under the supervision of and approved by Dr. Daniel McFadden, James R. Killian Professor of Economics, Massachusetts Institute of Technology. Totals and sub-totals in this Appendix may not reflect the sums of sub-elements due to rounding.)

[Pages 1-46 not reproduced]

SECTION 5. Indirect Employment and Income Generated by Canadian and United States Fishing on the Northeastern Portion of Georges Bank

14. In addition to the direct employment and GDP generated by fishing on the northeastern portion of Georges Bank, there are also indirect employment and GDP generated by demand for manufactured goods and services by the fishing industry and their suppliers and by consumer spending induced by changes in income ¹.

15. In its Memorial, Canada discusses this indirect employment and GDP in terms of multipliers. The method used to define and to measure multipliers is input-output analysis. Input-output analysis imposes assumptions that disregard the effects of modifications in production technique, possibilities for substitution between domestic goods and competitive imports, and redirection of capital, labor, and production induced by price changes. As a result, this analysis is open to the criticism that it tends to overstate the magnitude of total indirect employment and GDP generated by fishing on the northeastern portion of Georges Bank.

16. The United States has used a regional input-output analysis to estimate the indirect employment and GDP generated by fishing on the northeastern portion of Georges Bank. The input-output relationships upon which this analysis for Nova Scotia relies were taken from an official Canadian input-output study ². Although some information relating to input-output relationships in Nova Scotia beyond 1965 was

¹ Annex, para. 10, n.2.

² K. Levitt, *Input-Output Study of the Atlantic Provinces, 1965*, Vol. I: *Social Accounting Matrix and Models*, and Vol. II: *Structural Analysis and Data Sources*, Statistics Canada, 1975.

	<u>Nova Scotia</u>	<u>New England</u>
Ratio of total income change to income change in fish harvesting and processing *	2.29	1.58
Ratio of total employment change to employment change in fish harvesting and processing	1.60	1.70

* The measure of income for Nova Scotia is gross domestic product originating, and for the New England states is gross value added. The unavailability of the gross domestic product measure in the U.S. regional tables or the value added measure in the Nova Scotia tables precluded the use of the same measure in both regions. Gross domestic product originating is a slightly broader income concept than value added, the difference being minor income components such as indirect taxes.

available, that information was not comparable with available information for the United States. For that reason, the analysis contained herein relies upon the input-output relationships contained in the 1965 study¹. For New England, the basic input-output relationships were based on an input-output study for 1972 conducted as part of a research program under the auspices of the United States National Academy of Sciences².

¹ Comparison of the 1965 relationships with available data from more recent studies suggests that calculations based upon more recent studies are likely to yield slightly smaller effects; thus, the use of the 1965 relationships favor Canada. See K. R. Polenske and P. G. Jordan, "The Economic Impact of Fisheries on Nova Scotia and New England", unpublished report, Massachusetts Institute of Technology, 1983.

² For New England the basic sources are the *Regional Purchase Coefficient Model for 1972 for New England States*, and Stevens *et al.*: *Basic Regional Input-Output for Transportation Impact Analysis* report prepared for the National Cooperative Highway Research Program under the auspices of the National Academy of Sciences, 1982.

Technical Notes

17. In order to estimate indirect employment and GDP, it is assumed that fishing on the northeastern portion of Georges Bank were to cease. These estimates are made under three additional assumptions that are selected to give *upper bounds* to the effect that such cessation of fishing would have on employment and GDP. A variety of additional factors, however, such as net income transfers to the region, redirection of labor and capital, and reductions in imports and export earnings, all would be expected to reduce such effects.

The assumptions are:

- (1) For calculation of Canadian effects, jurisdiction over the northeastern portion of Georges Bank is confirmed for the United States; the reverse is assumed for calculation of United States effects.
- (2) Regional income and employment now generated by fishing on the northeastern portion of Georges Bank are not offset to any degree by increased net transfer payments (such as unemployment compensation) to the region.
- (3) The direct effect of a decline in fish harvesting and processing will be a reduction in net exports of fish products.
- (4) No requirement is imposed that a reduction in exports be matched by reduction of imports of equivalent value; that is, no balance of payments constraint is imposed between the region and the rest of the nation and world.

18. In Nova Scotia, assumption (3) is reasonable, because a large proportion of its harvest from the northeastern portion of Georges Bank is exported in the form of frozen scallops, frozen blocks of groundfish, fresh fish, frozen fillets, and other fish products. Domestic consumption can be met fully by fishing from other areas. Hence, the initial effect of a reduction in fishing, before induced effects on domestic consumption are taken into account, will be a reduction in processed fish exports. Assumption (3) is also reasonable for New England. Its share of the harvest from the northeastern portion of Georges Bank is predominantly sold as fresh fish to the domestic market. The initial effect of a reduction in fishing would be an increase in imports (a decrease in *net* exports) of fish products. Another possible effect in the United States might be the substitution by consumers of other commodities for fresh fish, which would result in slightly less loss of employment and income in New England.

19. Assumptions (2), that there will be no change in net transfer payments to the region, and Assumption (4), that there will be no adjustments in imports to maintain regional trade balance, are not likely to hold strictly, and thus the calculation of effect made here is overstated. A decline in employment in a region will increase unemployment compensation. This net transfer will offset a portion of the reduction in regional income, reducing the magnitude of final effects. Regional trade deficits lead to increased claims by outsiders on the products of the region, which will eventually be accommodated by increased demand for exports by outsiders, and increased prices for outside goods relative to regional goods which lead to substitution of domestic goods for imports. Both effects tend to stimulate domestic production and income, which act to offset the initial effects of the loss of employment and income. Therefore, assumptions (2) and (4) represent "worst case" conditions that produce upper bounds on the magnitude of indirect and induced effects.

20. Assumptions different from (1) through (4) will produce different estimates of indirect employment and GDP. It is not possible to determine precisely what conditions actually would hold in these regional economies, and consequently what total effect actually would result. The "worst case" assumptions (1) through (4) should, however, provide upper bounds on the magnitude of actual total effects.

21. The procedure used to estimate the indirect employment and GDP is to consider the input-output relationships between deliveries of commodities to final consumption and net export, and the domestic output of these commodities, as well as the employment and income originated per unit of output of each commodity. These relationships take into account indirect requirements for commodities used as inputs to the production of other commodities, as well as requirements due to changes in consumption patterns induced by changes in income. From Assumption (3), a drop in output of the fish harvesting sector equal to landed value from the northeastern part of Georges Bank is accommodated by a drop in net exports of the processed fish sector; the input-output relationship gives the relative quantities. The drop in net exports of processed fish has impacts on the outputs of all commodities in the region, and consequently on the income and employment generated by each industry. Accumulating these effects over industries gives total income and employment generated by fishing on the northeastern portion of Georges Bank. The ratio of a total impact to the impact on fish harvesting and processing then provides a measure of the magnitude of indirect and induced effects.

22. The elements of a regional input-output system required for the estimates of indirect employment and GDP reported here may be summarized using the following notation:

$i = 1, 2, \dots, N$ industries (1 = fish harvesting, 2 = fish processing)

x_i = change in the total domestic output of industry i

f_i = change in the net exports of the product of industry i

a_{ij} = change in the input of industry i goods per unit change in the total domestic output of industry j (direct effect)

c_{ij} = change in the total domestic output of industry i per unit change in net exports of the product of industry j , including direct and indirect inter-industry requirements and the induced effect of income changes. (type II direct, indirect, and induced requirements.)

v_i = income originating in industry i per unit of total domestic output in this industry.

l_i = employment originating in industry i per unit of total domestic output in this industry.

Consider the impact of a specified change x_1 in industry 1 which is accommodated by a change f_2 in the net exports of industry 2. For type II response including induced effects, this requires $x_1 = c_{12} f_2$ or $f_2 = x_1/c_{12}$. The change in the total domestic output of industry i is then $x_i = c_{i2} f_2 = x_1 c_{i2}/c_{12}$, for $i = 2, \dots, N$. The change in income originating in industry i is then $y_i = v_i x_i = x_1 v_i c_{i2}/c_{12}$, and the total change in income is

$$(1) y = y_1 + \dots + y_N = \frac{x_1}{c_{12}} (v_1 c_{12} + v_2 c_{22} + \dots + v_N c_{N2})$$

The expression

$$(2) m_2 = (v_1 c_{12} + v_2 c_{22} + \dots + v_N c_{N2})/v_2$$

is termed the (type II) income multiplier on industry 2 deliveries to final demand (net exports). In terms of this multiplier,

$$(3) y = x_1 m_2 v_2/c_{12}.$$

23. The *direct* income impact in industries 1 and 2 is calculated as follows. As before, the change x_1 in output of industry 1 is translated into a direct change $f_2 = x_1/c_{12}$ in net exports of industry 2. The change in income generated directly by industry 1 is $y_1 = v_1 x_1$. The *direct* output change in industry 2 is x_{2d} satisfying $x_1 = a_{12} x_{2d}$, where a_{12} is the direct inter-industry coefficient. Then $x_{2d} = x_1/a_{12}$ and the direct income change in industry 2 is $y_{2d} = v_2 x_{2d} = v_2 x_1/a_{12}$. The *direct* income change in industries 1 and 2 combined is then

$$(4) y_1 + y_{2d} = v_1 x_1 + v_2 x_1/a_{12}.$$

The ratio of the total change in income to the direct change in income in industries 1 and 2 is given by the ratio of (3) to (4),

$$(5) \frac{y}{y_1 + y_{2d}} = \frac{m_2 v_2}{c_{12} (v_1 + v_2/a_{12})}.$$

The change in employment originating in industry i is $L_i = l_i x_i = x_1 l_i c_{i2}/c_{12}$, and the total change in employment is

$$(6) L = L_1 + \dots + L_n = \frac{x_1}{c_{12}} n_2 l_2,$$

where

$$(7) n_2 = (l_1 c_{12} + l_2 c_{22} + \dots + l_n c_{n2})/l_2$$

is termed the (type II) employment multiplier on industry 2.

24. The *direct employment impact on industries 1 and 2* is calculated in the same way as the direct income impact, except direct employment coefficients, rather than direct income coefficients, are used. With L_{2d} as the direct employment change in industry 2, the direct employment change in industries 1 and 2 combined is

$$(8) L_1 + L_{2d} = l_1 x_1 + l_2 x_1/a_{12}.$$

The ratio of total change in employment to the direct change in employment in industries 1 and 2 combined is given by the ratio of (6) to (8),

$$(9) \frac{L}{L_1 + L_{2d}} = \frac{n_2 l_2}{c_{12} (l_1 + l_2/a_{12})}$$

Nova Scotia Calculations

For Nova Scotia, where the measure of income is gross domestic product originating, coefficients and multipliers from the 1965 tables given by Levitt are as follows;

Symbol	Value	Source (Table in Levitt, 1975)
v_1	.639503	(A), row 50, col. 3
v_2	.287482	(A), row 50, col. 7
l_1	.190679	(A), row 51, col. 3
l_2	.061918	(A), row 51, col. 7
a_{12}	.566160	(A), row 3, col. 7
c_{12}	.503884	(B), row 3, col. 7
m_2	4.60071	(C), row 13, col. 7, divided by (A), row 50, col. 7
n_2	3.899	(C), row 14, col. 7, divided by (A), row 51, col. 7

These values yield the following ratios:

Ratio of total to Industries 1 and 2	Income (GDP originating)	Employment
type II	2.28789	1.59681

SOURCE: K. Levitt: *Input-Output Study of the Atlantic Province, 1965, Vol. I: Social Accounting Matrix and Models*, and *Vol. II: Structural Analysis and Data Sources*, Statistics Canada, 1975.

(A) Model 1 Nova Scotia 1965, Input Coefficients of Industries B* and of Final Expenditure Categories

(B) Model 2 Nova Scotia 1965, $INV(I-J^*(I-U)B^*)$ Requirements for Industry Output per Unit Industry Output

(C) Model 2 Nova Scotia 1965, $(V^*/Q^*)INV(I-J^*(I-U)B^*)$ Primary Input Requirements per Unit Industry Output

New England Calculations, 1972 Input-Output Coefficients

For New England states, data, coefficients and multipliers from the Regional Purchase Coefficient model by Stevens et al. and the Regional Science Research Institute are as follows:

	Massachusetts	Rhode Island	Maine	Total
Output Sector 9 — forestry and fishing products (000)	123,288	12,986	13,036	149,310
Output Sector 42 — fresh and frozen packaged fish (000)	316,524	3,925	49,751	370,200
Value Added 9 (000)	79,241	8,346	8,379	95,966
Value Added 42 (000)	51,844	643	8,149	60,636
Employment 9 ¹	2,975	206	619	3,800
Employment 42 ¹	2,597	45	618	3,260
v_1	.64273	.64273	.64273	.64273 ²
v_2	.16379	.16379	.16379	.16379 ²
l_1	.02413	.01586	.04748	.02545 ²
l_2	.00820	.01147	.01242	.00881 ²
c_{12}	.36754	.482708	.044005	.325281 ³
a_{12}	.364389	.480289	.043833	.322538 ³
m_2	3.91	4.24	1.68	3.61 ⁴
n_2	3.67	2.84	1.81	3.31 ⁴
NE Portion landings (000) ⁶	15,603	2,016	1,225	18,844
fraction	.8280	.1070	.0650	
VA ratio ⁷	1.5953	1.46245	1.4278	1.5799
Employment ratio ⁸	1.7558	1.69806	1.5442	1.6990

SOURCE: based on Stevens et al.: *Basic Regional Input-Output for Transportation Impact Analysis*. (See note 5, *supra*.)

¹ Employment in the U.S. tables excludes individual proprietors, and hence undercounts total workers. This undercount is minor for Sector 42, but substantial for Sector 9.

² The direct value added and employment coefficients for the total of Massachusetts, Rhode Island, and Maine are obtained by dividing total value added and employment, respectively, by total output.

³ The total direct, indirect, and induced (type II) interindustry coefficients are obtained by adding the state coefficients times sector 42 output, and dividing the result by total output.

⁴ The total type II value added multiplier is obtained by adding the state value added multipliers by state value added in Sector 42, and dividing the result by total value added in Sector 42.

(footnote continued on next page)

(footnote continued from the previous page)

⁵ The total type II employment multiplier is obtained by adding the state employment multipliers by state employment in Sector 42, and dividing the result by total value added in Sector 42.

⁶ Northeastern portion of Georges Bank value of landings in 1980, expressed in 1972 U.S. dollars.

⁷ The ratio of direct, indirect, and induced value added in the region to the direct value added in fish harvesting and processing, from equation (5), computed from the coefficients and multipliers for each state, and the total coefficients and multiplier. An alternative definition of a total VA ratio is the average of state VA ratios weighted by state shares in combined Sectors 9 and 42 value added; this ratio is 1.5700. A second alternative definition is the average of state VA ratios weighted by state shares in the disputed zone harvest; this ratio is 1.5702.

⁸ The ratio of direct, indirect, and induced employment in the region to the direct employment in fish harvesting and processing, from equation (9), computed from the coefficients and multipliers for each state, and the total coefficients and multiplier. An alternative definition of a total employment ratio is the average of state employment ratios weighted by state shares in combined Sector 9 and 42 employment; this ratio is 1.7168. A second alternative definition is the average of state employment ratios weighted by state shares in the northeastern portion of Georges Bank harvest; this ratio is 1.7364. If the employment ratios are applied to fish harvesting and processing employment including individual proprietors, then the ratios should be reduced by a percentage equal to the percentage of proprietors among fish harvesting and processing workers. Approximately 10 percent of the harvesting and processing work originating in the disputed zone is individual proprietors.

Appendix C to Annex 4**THE SMALL-VESSEL FLEET OF SOUTHWEST NOVA SCOTIA***[Not reproduced]*

Appendix D to Annex 4**CANADIAN FISHERY POLICIES***[Not reproduced]*

Appendix E to Annex 4

SELECTED UNITED STATES AND CANADIAN CATCH AND LANDINGS DATA

(Totals and sub-totals in this Appendix may not reflect the sums of sub-elements due to rounding.)

1. The following information regarding catch and landings is used throughout this Annex and its appendices. Information in Tables 1 through 10 and 17 and 18 were obtained as noted on each table. Tables 11 through 14 contain estimates of the distribution among Nova Scotia Fisheries Districts of landings from the northeastern portion of Georges Bank. The calculation of the distribution of those landings was performed by prorating by species group the total Canadian landings from the northeastern portion of Georges Bank among the Fisheries Districts of Nova Scotia on the basis of the proportion of offshore landings to total offshore landings for all those districts identified as having landings from Georges Bank. It was necessary to estimate these district landings in this fashion, because detailed information on landings by area of catch by district (or port) for Canada is not available to the United States. Information on landings by district was obtained from tables containing unpublished data from the Department of Fisheries and Oceans of Canada deposited with this Counter-Memorial.

TABLE 1

Respective United States and Canada Shares of Combined Georges Bank
Catch (All Species) by Weight 1940-1981 *

YEAR	UNITED STATES	CANADA	UNITED STATES % OF TOTAL	CANADIAN % OF TOTAL
1940	94,073	0	100	0
1941	112,521	0	100	0
1942	90,354	0	100	0
1943	86,733	0	100	0
1944	90,747	0	100	0
1945	79,151	0	100	0
1946	106,258	0	100	0
1947	115,685	0	100	0
1948	117,462	0	100	0
1949	127,439	0	100	0
1950	94,419	0	100	0
1951	106,289	0	100	0
1952	83,611	0	100	0
1953	74,850	0	100	0
1954	91,288	239	99	1
1955	106,987	289	99	1
1956	115,563	707	99	1
1957	116,346	0	100	0
1958	89,944	2,562	97	3
1959	97,448	4,106	96	4
1960	105,480	6,025	95	5
1961	164,760	5,482	95	5
1962	116,520	9,690	90	10
1963	110,805	27,088	80	20
1964	111,097	30,067	79	21
1965	109,765	35,123	76	24
1966	110,930	47,089	70	30
1967	92,668	37,189	71	29
1968	83,345	42,596	66	34
1969	74,191	21,154	78	22
1970	76,774	7,094	86	14
1971	73,362	24,787	75	25
1972	81,658	9,848	89	11
1973	62,275	16,750	79	21
1974	58,261	12,123	83	17
1975	59,295	15,959	79	21
1976	54,700	16,560	77	25
1977	71,190	26,392	73	27
1978	83,196	37,287	69	31
1979	92,975	24,082	79	21
1980	106,158	30,583	78	22
1981	101,120	28,605	78	22

* Scallop component in metric tons, meat weight.

SOURCES: Annexes 17 and 20, Vol. V.

TABLE 2

Respective United States and Canada Shares of Combined Georges Bank
Scallop Catch by Weight 1940-1981
(In metric tons meat weight)

YEAR	UNITED STATES	CANADA	UNITED STATES % OF TOTAL	CANADIAN % OF TOTAL
1940	2,002	0	100	0
1941	2,531	0	100	0
1942	2,470	0	100	0
1943	1,738	0	100	0
1944	1,814	0	100	0
1945	1,769	0	100	0
1946	4,036	0	100	0
1947	4,853	0	100	0
1948	4,580	0	100	0
1949	5,306	0	100	0
1950	5,442	0	100	0
1951	5,714	0	100	0
1952	5,488	0	100	0
1953	7,392	0	100	0
1954	7,029	125	98	2
1955	8,299	150	98	2
1956	7,937	368	96	4
1957	7,846	0	100	0
1958	6,331	1,333	83	17
1959	8,481	2,136	80	20
1960	9,932	3,134	76	24
1961	10,660	4,565	70	30
1962	9,690	5,715	63	37
1963	7,910	5,898	57	43
1964	6,241	5,922	51	49
1965	1,510	4,434	25	75
1966	902	5,081	15	85
1967	1,230	5,019	20	80
1968	994	4,820	17	83
1969	1,325	4,316	23	77
1970	1,415	4,097	26	74
1971	1,329	3,908	25	75
1972	821	4,161	16	84
1973	1,080	4,223	20	80
1974	925	6,137	13	87
1975	857	7,414	10	90
1976	1,770	9,761	15	85
1977	4,805	12,435	28	72
1978	5,589	12,189	31	69
1979	6,589	9,208	42	58
1980	5,459	5,221	51	49
1981	8,413	8,013	51	49

SOURCE: Annex 20, Vol. V.

TABLE 3
Comparison of Total Atlantic Canada and
Northeastern Portion of Georges Bank Catch

Quantity (Metric tons Round weight)				
<u>Catch—Atlantic Canada ¹</u>				
Species	Year	Total	Northeastern Portion of Georges Bank ²	Per cent Northeastern Portion of Georges Bank of Total
Groundfish ³	1977	510,998	12,655	2.48%
	1978	602,279	24,807	4.12
	1979	690,141	14,571	2.11
	1980	736,284	24,940	3.39
	1981	767,541	20,391	2.66
Sea Scallops	1977	117,035	103,208	88.19%
	1978	108,746	101,170	93.03
	1979	88,730	76,423	86.13
	1980	70,473	43,334	61.49
	1981	89,892	66,511	73.99
Lobster	1977	17,802	229	1.29%
	1978	19,176	285	1.49
	1979	21,578	240	1.11
	1980	20,089	194	0.97
	1981	21,695	175	0.81
Other	1977	367,222	375	0.10%
	1978	416,530	6	—
	1979	423,320	63	0.01
	1980	350,360	228	0.07
	1981	326,269	26	0.01
TOTAL	1977	1,013,057	116,467	11.50%
	1978	1,146,731	126,268	11.01
	1979	1,223,769	91,297	7.96
	1980	1,177,206	68,696	5.84
	1981	1,205,397	87,103	7.23

— = Negligible

¹The information presented in this table is the same as that found in Annex 22, Vol. V.

²Atlantic Canada includes the Maritime provinces (Nova Scotia, New Brunswick, Prince Edward Island), Newfoundland, and Quebec.

³Activity in the northeastern portion of Georges Bank is assumed to correspond to activity in NAFO Division 5Ze for all years except 1977; the quantity of fish caught in 1977 in the northeastern portion of Georges Bank is assumed to be 95 per cent of the quantity reported by NAFO for Division 5Ze.

⁴Groundfish are defined as all species identified by NAFO codes 101 through 199; the principal species include cod, haddock, redfish, pollock, turbot, and a variety of species of flatfish.

SOURCE: ICNAF/NAFO Statistical Bulletins for 1977 through 1981 Table 3.

TABLE 4
Comparison of Value of Total Atlantic Canada and
Northeastern Portion of Georges Bank Bank Catch

Current \$ (× 1000) ¹

Value of Catch—Atlantic Canada ²				
Species	Year	Total	Northeastern Portion of Georges Bank ³	Percent Northeastern Portion of Georges Bank of Total
Groundfish ⁴	1977	119,946.6	2,970.5	2.48%
	1978	159,676.2	6,576.8	4.12
	1979	203,922.9	4,305.4	2.11
	1980	239,822.4	8,123.5	3.39
	1981	260,119.7	6,910.5	2.66
Sea Scallops	1977	44,162.0	38,944.4	88.19%
	1978	63,099.9	58,703.9	93.03
	1979	73,820.7	63,581.6	86.13
	1980	68,496.9	42,118.9	61.49
	1981	99,879.9	73,901.0	73.99
Lobster	1977	56,515.7	727.0	1.29%
	1978	75,579.1	1,123.3	1.49
	1979	83,805.7	932.1	1.11
	1980	80,015.9	772.7	0.97
	1981	91,710.6	739.8	0.81
Other	1977	69,247.1	70.7	0.10%
	1978	115,753.7	1.7	—
	1979	141,702.1	21.1	0.01
	1980	129,720.8	84.4	0.07
	1981	117,456.9	9.4	0.01
TOTAL	1977	289,871.4	42,712.6	14.7%
	1978	414,108.9	66,405.7	16.0
	1979	503,251.4	68,840.2	13.7
	1980	518,056.0	51,099.5	9.9
	1981	569,167.1	81,560.7	14.3

— Negligible

¹ The value of the catch shown is expressed in current Canadian dollars, and was derived by multiplying the quantities shown in Table 3 by the average price per metric ton of each species group obtained from selected Canadian publications. See Table 17 for the prices used and the sources consulted.

² Atlantic Canada includes the Maritime provinces (Nova Scotia, New Brunswick, Prince Edward Island), Newfoundland, and Quebec.

³ Activity in the northeastern portion of Georges Bank is assumed to correspond to activity in NAFO Division 5Ze for all years except 1977; the quantity of fish caught in 1977 in the northeastern portion of Georges Bank is assumed to be 95 per cent of the quantity reported by NAFO for Division 5Ze.

⁴ Groundfish are defined as all species identified by NAFO codes 101 through 199; the principal species include cod, haddock, redfish, pollock, turbot, and a variety of species of flatfish.

SOURCES: ICNAF/NAFO Statistical Bulletins for 1977 through 1981, Table 3; Canadian Fisheries, *Annual Statistical Reviews*, Volumes 11-13, 1978 through 1980; Task Force on Atlantic Fisheries *Navigating Troubled Waters*, 1982.

TABLE 5
Comparison of Value of Total Atlantic Canada and
Northeastern Portion of Georges Bank Catch

1972 US \$ (× 1000)¹

<u>Value of Catch-Atlantic Canada¹</u>				
Species	Year	Total	Northeastern Portion of Georges Bank ²	Percent Northeastern Portion of Georges Bank of Total
Groundfish ⁴	1977	78,258.4	1,938.1	2.48%
	1978	89,504.6	3,868.5	4.12
	1979	106,855.4	2,256.0	2.11
	1980	112,371.1	3,806.3	3.39
	1981	112,188.3	2,980.5	2.66
Sea Scallops	1977	28,813.2	25,409.0	88.19%
	1978	35,369.9	32,905.8	93.03
	1979	38,682.0	33,316.7	86.13
	1980	32,094.9	19,735.2	61.49
	1981	43,077.7	31,873.1	73.99
Lobster	1977	36,873.3	474.3	1.29%
	1978	42,365.0	629.7	1.49
	1979	43,914.1	488.4	1.11
	1980	37,492.2	362.1	0.97
	1981	39,554.3	319.1	0.81
Other	1977	45,179.8	46.1	0.10%
	1978	64,884.4	1.0	—
	1979	74,251.8	11.1	0.01
	1980	60,781.9	39.5	0.07
	1981	50,658.6	4.1	0.01
TOTAL	1977	189,124.7	27,867.5	14.7%
	1978	232,123.8	37,222.9	16.0
	1979	263,703.3	36,072.2	13.7
	1980	242,740.1	23,943.2	9.9
	1981	245,478.9	35,176.8	14.3

— Negligible

¹ The value of the catch shown here was derived by dividing the value of the catch in current Canadian dollars (see Table 4) by the appropriate conversion factors. See Appendix A, Table 3, for the conversion factors used to convert Canadian dollars to constant 1972 U.S. dollars.

² Atlantic Canada includes the Maritime provinces (Nova Scotia, New Brunswick, Prince Edward Island), Newfoundland, and Quebec.

³ Activity in the northeastern portion of Georges Bank is assumed to correspond to activity in NAFO Division 5Ze for all years except 1977; the quantity of fish caught in 1977 in the northeastern portion of Georges Bank is assumed to be 95 per cent of the quantity reported by NAFO for Division 5Ze.

⁴ Groundfish are defined as all species identified by NAFO codes 101 through 199; the principal species include cod, haddock, redfish, pollock, turbot, and a variety of species of flatfish.

SOURCES: ICNAF/NAFO Statistical Bulletins for 1977 through 1981, Table 3; Canadian Fisheries, *Annual Statistical Reviews*, Vol. 11-13, 1978 through 1980; Task Force on Atlantic Fisheries, *Navigating Troubled Waters*, 1982; U.S. Government Printing Office, *Economic Report of the President*, February 1983; International Monetary Fund, Bureau of Statistics, *International Financial Statistics*, 1982.

TABLE 6
Canadian Catch by Species and Tonnage Class From
Northeastern Portion of Georges Bank ¹

		Quantity (Metric tons Round weight)				
		Tonnage Class				
Species	Year	0-24.9 GRT	25-49.9 GRT	50-149.9 GRT	150+ GRT	Total
Groundfish ¹	1977	—	818	1,492	10,345	12,655
	1978	—	1,485	2,357	20,965	24,807
	1979	—	1,877	3,071	9,623	14,571
	1980	2,476	2,267	1,522	18,675	24,940
Sea Scallops	1977	466	1,777	14,435	86,530	103,208
	1978	—	749	13,346	87,075	101,170
	1979	—	25	8,315	68,083	76,423
	1980	—	—	3,064	40,270	43,334
Lobster	1977	—	—	200	29	229
	1978	—	—	180	105	285
	1979	—	—	165	75	240
	1980	—	—	157	37	194
Other	1977	—	5	17	353	375
	1978	—	—	—	6	6
	1979	—	—	—	63	63
	1980	—	82	74	72	228
TOTAL	1977	466	2,600	16,144	97,257	116,467
	1978	—	2,234	15,883	108,151	126,268
	1979	—	1,902	11,551	77,844	91,297
	1980	2,476	2,349	4,817	59,054	68,696

— Known to be zero

GRT = gross registered tonnage

¹ Activity in the northeastern portion of Georges Bank is assumed to correspond to activity in NAFO Division 5Ze for all years except 1977; the quantity of fish caught in 1977 in the northeastern portion of Georges Bank is assumed to be 95 per cent of the quantity reported by NAFO for Division 5Ze.

² Groundfish are defined as all species identified by NAFO codes 101 through 199; the principal species include cod, haddock, redfish, pollock, turbot, and a variety of species of flatfish.

SOURCE: ICNAF/NAFO Statistical Bulletins for 1977 through 1980, Table 5.

TABLE 7
Value of Canadian Catch by Species and Tonnage Class
From Northeastern Portion of Georges Bank¹

Current \$ (× 1000)

Species	Year	Tonnage Class				Total
		0-24.9 GRT	25-49.9 GRT	50-149.9 GRT	150+ GRT	
Groundfish ⁴	1977	—	192.0	350.2	2,428.3	2,970.5
	1978	—	393.7	624.9	5,558.2	6,576.8
	1979	—	554.6	907.4	2,843.4	4,305.4
	1980	806.5	738.4	495.7	6,082.8	8,123.5
Sea Scallops	1977	175.8	670.5	5,446.9	32,651.2	38,944.4
	1978	—	434.6	7,744.0	50,525.2	58,703.9
	1979	—	20.8	6,917.8	56,643.0	63,581.6
	1980	—	—	2,978.1	39,140.8	42,118.9
Lobster	1977	—	—	634.9	92.1	727.0
	1978	—	—	709.4	413.8	1,123.3
	1979	—	—	640.8	291.3	932.1
	1980	—	—	625.3	147.4	772.7
Other	1977	—	0.9	3.2	66.6	70.7
	1978	—	—	—	1.7	1.7
	1979	—	—	—	21.1	21.1
	1980	—	30.4	27.4	26.7	84.4
TOTAL	1977	175.8	863.4	6,435.2	35,238.2	42,712.6
	1978	—	828.3	9,078.3	56,498.9	66,405.7
	1979	—	575.4	8,466.0	59,798.8	68,840.2
	1980	806.5	768.8	4,126.5	45,397.7	51,099.5

— Known to be zero

GRT = gross registered tonnage

¹ Activity in the northeastern portion of Georges Bank is assumed to correspond to activity in NAFO Division 5Ze for all years except 1977; the quantity of fish caught in 1977 in the northeastern portion of Georges Bank is assumed to be 95 per cent of the quantity reported by NAFO for Division 5Ze.

² The value of the catch shown here is expressed in current Canadian dollars and was derived by multiplying the quantities shown in Table 6 by the average price per metric ton of each species group obtained from selected Canadian publications. See Table 17 for the prices used and sources consulted.

⁴ Groundfish are defined as all species identified by NAFO codes 101 through 199; the principal species include cod, haddock, redfish, pollock, turbot, and a variety of species of flatfish.

SOURCE: ICNAF/NAFO Statistical Bulletins for 1977 through 1980, Table 5; Canadian Fisheries, *Annual Statistical Reviews*, Vol.11-13, 1978 through 1980.

TABLE 8
Value of Canadian Catch by Species and Tonnage Class
From the Northeastern Portion of Georges Bank ¹

		1972 US \$ (× 1000) ²				
Species	Year	Tonnage Class				Total
		0-24.9 GRT	25-49.9 GRT	50-149.9 GRT	150+ GRT	
Groundfish ³	1977	—	125.3	228.5	1,584.3	1,938.1
	1978	—	220.7	350.3	3,115.6	3,686.5
	1979	—	290.6	475.5	1,489.9	2,256.0
	1980	377.9	346.0	232.3	2,850.2	3,806.3
Sea Scallops	1977	114.7	437.5	3,553.8	21,303.1	25,409.1
	1978	—	243.6	4,340.8	28,321.3	32,905.8
	1979	—	10.9	3,624.9	29,680.9	33,316.7
	1980	—	—	1,395.4	18,339.8	19,735.2
Lobster	1977	—	—	414.2	60.1	474.3
	1978	—	—	397.6	232.0	629.7
	1979	—	—	335.8	152.6	488.4
	1980	—	—	293.0	69.1	361.9
Other	1977	—	0.6	2.1	43.5	46.2
	1978	—	—	—	1.0	1.0
	1979	—	—	—	11.1	11.1
	1980	—	14.2	12.8	12.5	39.5
TOTAL	1977	114.7	563.4	4,198.6	22,991.0	27,867.7
	1978	—	464.3	5,088.7	31,669.8	37,222.9
	1979	—	301.5	4,436.2	31,334.5	36,072.2
	1980	377.9	360.2	1,933.5	21,271.5	23,943.2

— Known to be zero

GRT = gross registered tonnage

¹ Activity in the northeastern portion of Georges Bank is assumed to correspond to activity in NAFO Division 5Zc for all years except 1977; the quantity of fish caught in 1977 in the northeastern portion of Georges Bank is assumed to be 95 per cent of the quantity reported by NAFO for Division 5Zc.

² The value of the catch shown here was derived by dividing the value of the catch in current Canadian dollars (see Table 7) by appropriate conversion factors. See Appendix A, Table 3, for the conversion factors used to convert Canadian dollars to constant 1972 U.S. dollars.

³ Groundfish are defined as all species identified by NAFO codes 101 through 199; the principal species include cod, haddock, redfish, pollock, turbot, and a variety of species of flatfish.

SOURCE: ICNAF/NAFO Statistical Bulletins for 1977 through 1980, Table 5; Canadian Fisheries, Annual Statistical Reviews, Vol. 11-13, 1978 through 1980; U.S. Government Printing Office, Economic Report of the President, February, 1983; International Monetary Fund, International Financial Statistics, 1982.

TABLE 9
Canadian Catch by Species and Gear Type From
the Northeastern Portion of Georges Bank¹

Species	Year	Gear Type ²						Total
		OTM	DRB	LL(X)	OTB(X)	FPO	PS	
Groundfish ³	1977	1	2	1,061	11,591	—	—	12,655
	1978	615	6	1,384	22,802	—	—	24,807
	1979	—	9	2,273	12,289	—	—	14,571
	1980	—	24	4,313	20,602	1	—	24,940
Sea Scallops	1977	—	103,208	—	—	—	—	103,208
	1978	—	101,170	—	—	—	—	101,170
	1979	—	76,423	—	—	—	—	76,423
	1980	—	43,334	—	—	—	—	43,334
Lobster	1977	1	—	—	—	228	—	229
	1978	—	—	—	—	285	—	285
	1979	—	—	—	—	240	—	240
	1980	—	—	—	—	194	—	194
Other	1977	7	—	15	30	—	323	375
	1978	—	—	—	6	—	—	6
	1979	—	49	—	14	—	—	63
	1980	—	31	156	41	—	—	228
TOTAL	1977	9	103,210	1,076	11,621	228	323	116,467
	1978	615	101,176	1,384	22,808	285	—	126,268
	1979	—	76,481	2,273	12,303	240	—	91,297
	1980	—	43,389	4,469	20,643	195	—	68,696

— Known to be zero.

¹ Activity in the northeastern portion of Georges Bank is assumed to correspond to activity in NAFO Division 5Ze for all years except 1977; the quantity of fish caught in 1977 in the northeastern portion of Georges Bank is assumed to be 95 per cent of the quantity reported by NAFO for Division 5Ze.

² OTM = Midwater Otter Trawl; DRB = Boat Dredge; LL(X) = Longlines; OTB(X) = Otter Trawls; FPO = Covered Pots; PS = Purse Seines.

³ Groundfish are defined as all species identified by NAFO codes 101 through 199; the principal species include cod, haddock, redfish, pollock, turbot, and a variety of flatfishes.

SOURCE: ICNAF/NAFO Statistical Bulletins for 1977 through 1980, Table 5.

TABLE 10
Vessel Gear Summary

I. Glossary Abbreviations for Gear

DRB = boat dredge
 LL = longlines
 OTB = bottom beam other trawl
 FPO = covered pots
 GN = gillnets
 OTM = midwater otter trawl
 PS = purse seine
 SDN = Danish seine
 SSC = Scottish seine

II. Normal Gear Usage

Gear Type	Major Species Fished
Boat Dredge	Scallops
Bottom Otter, Trawls	Groundfish, Shrimp
Long-Liners	Groundfish Swordfish
Purse Seines	Mackerel, Herring
Seines	Groundfish
Covered Pots	Lobsters
Gill Nets	Groundfish

TABLE 11
Canadian Landings By Species and By Nova Scotia Fisheries District
From the Northeastern Portion of Georges Bank (1980)¹

District	Groundfish			Scallops			Lobster			Other			Total	
	(m.t.) Quantity	(000s) 1972 U.S. \$	(m.t.) Quantity	(m.t.) Quantity	(000s) 1972 U.S. \$	(m.t.) Quantity	(m.t.) Quantity	(000s) 1972 U.S. \$	(m.t.) Quantity	(000s) 1972 U.S. \$	(m.t.) Quantity	(000s) 1972 U.S. \$	(m.t.) Quantity	(000s) 1972 U.S. \$
1														
2														
3														
4														
6	2,025	309									64	11	2,089	320.0
7	2,833	432									1	0.1	2,834	432.1
9														
10														
11														
12														
13														
14														
15	3,524	538									11	2	3,535	540.0
16	4	0.5									27	5	31	5.5
17														
18														
19														
20											2	0.2	1,643	250.2
21	1,641	250												
23														
24														
25														
26														
27	7,627	1,164	27,040	12,315							1	0.1	34,668	13,479.1
28	833	127	2,860	1,303							3	0.6	3,707	1,450.6
30	835	128	17	8							3	0.5	880	182.5
31	1,107	169	43	20							2	0.3	1,310	485.3
32	1,409	215	13	6							12	2	1,434	223.0
33	436	67									45	8	481	75.0
34	247	38	3,748	1,707							33	6	4,028	1,751.0
35														
36	823	126	5,434	2,475							20	4	6,277	2,605.0
37	1,227	187	273	124							2	0.3	1,502	311.3
38	362	55	3,870	1,762							3	0.5	4,235	1,817.5
39	13	2	35	16									48	18.0
40														
46														
TOTAL	24,946	3,807.5	43,333	19,736		194	362.0		229	40.6			68,702	23,946.1

¹ The distribution of catch from the northeastern portion of Georges Bank to Nova Scotia Fisheries Districts was performed by (1) identifying the districts (ports) that had vessel (by gear type) reported to have fished Subarea 5 in 1980 (see Table 9 and NAFO *List of Fishing Vessels, 1980*); (2) identifying those that reported offshore landings in 1980 (see unpublished landings, Canada Dept. of Fisheries and Oceans); and (3) allocating the catch from the northeastern portion of Georges Bank catch to these districts on the basis of their proportion of offshore landings to total offshore landings from all of the affected districts.

Canadian Landings By Species and By Nova Scotia Fisheries District
From the Northeastern Portion of Georges Bank (1979)¹

TABLE 12

Quantity (Metric tons Round weight) Value (1972 US \$)	Groundfish				Scallops				Lobster				Other				Total			
	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$	(m.t.) Quantity 1972 U.S. \$	(000s) Quantity 1972 U.S. \$

[17-18]

ANNEXES TO COUNTER-MEMORIAL OF THE UNITED STATES

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1																				
2																				
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15																				
16																				
17																				
18																				
19																				
20																				
21	1,451.27	224.7																		
22	68.48	10.6																		
23	115.11	17.82																		
24																				
25																				
26	6,350.04	983.16	55,368.46	24,137.95																
27																				
28	709.61	109.87	5,662.94	2,468.77	31.2	63.49														
29	727.09	112.57																		
30	727.09	112.57																		
31	721.26	112.67	61	26.65	208.8	424.91														
32	1,269.13	196.5																		
33	135.51	20.98	4,661.8	2,032.32																
34	731.46	113.25	10,668.65	4,651.01																
35	1,079.71	167.17																		
36																				
37																				
38																				
39																				
40																				
46	14,571.87	2,257.21	76,422.85	33,316.7	240	488.4	62.98	11.1	91,318.26	36,074.41										

¹ The distribution of catch from the northeastern portion of Georges Bank to Nova Scotia Fisheries Districts was performed by (1) identifying the districts (ports) that had vessels (by gear type) reported to have fished Subarea 5 in 1977 (see Table 9 and ICNAF List of Fishing Vessels, 1977); (2) identifying those that reported offshore landings in 1979 (see unpublished landings Canada Dept. of Fisheries and Oceans); and (3) allocating the catch from the northeastern portion of Georges Bank to these districts on the basis of their proportion of offshore landings to total offshore landings from all of the affected districts.

TABLE 13

Canadian Landings By Species and By Nova Scotia Fisheries District
From the Northeastern Portion of Georges Bank (1978)¹

District	Groundfish		Scallops		Lobster		Other		Total	
	(m.t.)	(000s)	(m.t.)	(000s)	(m.t.)	(000s)	(m.t.)	(000s)	(m.t.)	(000s)
	Quantity	1972 U.S. \$	Quantity	1972 U.S. \$	Quantity	1972 U.S. \$	Quantity	1972 U.S. \$	Quantity	1972 U.S. \$
1										
2										
3										
4										
6	1,798.51	267.27					.87	.14	1,799.38	267.41
7										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21	2,227.7	331.1					1.3	.21	2,222.97	331.26
22	12.4	1.84							12.4	1.84
23	205.9	30.6							205.9	30.6
24										
25										
26	1,178.03	1,661.14	69,220.51	12,513.6			.04	.01	80,398.58	14,174.75
27										
28	1,227.95	182.48	9,509.98	3,093.1	33.36	73.67			10,771.29	3,349.25
30	1,706.72	253.63					.31	.05	1,707.03	253.68
31	1,168.41	173.63	18.2	5.9	251.66	556.03			1,438.27	735.56
32	1,925.02	286.07					.56	.09	1,925.58	286.16
33							1.48	.25	1.48	.25
34	74.72	11.06	8,356.64	2,718.0			.94	.16	8,432.3	2,729.22
36	1,490.9	211.56	14,062.63	4,574.0			.53	.09	15,554.06	4,775.65
37	1,796.13	266.9							1,796.13	266.9
38										
39										
40										
46										
TOTAL	14,812.39	3,677.28	101,168.0	22,904.6	285.02	629.7	4.86	1.0	126,265.37	27,202.53

¹ The distribution of catch from the northeastern portion of Georges Bank to Nova Scotia Fisheries Districts was performed by (1) identifying the districts (ports) that had vessels (by gear type) reported to have fished Subarea 5 in 1977 (see Table 9 and ICNAF List of Fishing Vessels, 1977); (2) identifying those identified by (1) that reported offshore landings in 1978 (see unpublished landings, Canada Dept. of Fisheries and Oceans); and (3) allocating the catch from the northeastern portion of Georges Bank to these districts on the basis of their proportion of offshore landings to total offshore landings from all of the affected districts.

TABLE 14
Canadian Landings By Species and By Nova Scotia Fisheries District
From the Northeastern Portion of Georges Bank (1977)¹

District	Groundfish			Scallops			Lobster			Other			Total		
	(000s)			(000s)			(000s)			(000s)			(000s)		
	Quantity	1972 U.S. \$	(m.t.)	Quantity	1972 U.S. \$	(m.t.)	Quantity	1972 U.S. \$	(m.t.)	Quantity	1972 U.S. \$	(m.t.)	Quantity	1972 U.S. \$	(m.t.)
1															
2															
3															
4															
5															
6															
7	1,033.9	158.34								70.01	8.63		1,103.91	166.97	
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21	1,676.8	256.8								72.23	8.9		1,749.03	265.7	
22	31.64	4.85								31.64			31.64	4.85	
23	92.38	14.15								92.38			92.38	14.15	
24															
25															
26	5,121	784.35								2.14	.26		68,906.16	16,487.43	
27															
28	793.47	121.52											15,578.09	3,808.62	
29	758.03	116.09					25.5	53.6		0.15	.02		758.18	116.11	
30	605.47	99.62											853.59	520.32	
31	765.63	117.26					203.12	120.7		34.09	4.2		799.72	121.46	
32										59.78	7.36		59.78	7.36	
33										111.71	13.76		8,509	2,077.71	
34	37.97	5.81								24.53	3.02		16,981.86	4,117.28	
35	650.47	99.62											1,041.51	159.51	
36															
37															
38	1,041.31	159.51													
39															
40															
41															
42															
43															
44															
45															
46															
TOTAL	12,608.26	1,938		103,208.04	25,409.1		229	174.3		374.64	46.15		116,465.43	27,867.5	

¹ The distribution of catch from the northeastern portion of Georges Bank to Nova Scotia Fisheries Districts was performed by (1) identifying the districts (ports) that had vessels (by gear type) reported to have fished Subarea 5 in 1977 (see Table 9 and ICNAF List of Fishing Vessels, 1977); (2) identifying those that reported offshore landings in 1980 (see unpublished landings, Canada Dept. of Fisheries and Oceans); and (3) allocating the catch from the northeastern portion of Georges Bank catch to these districts on the basis of their proportion of offshore landings to total offshore landings from all of the affected districts.

TABLE 15
New England Landings and Value By Species

Year	Landings (Metric tons—Round weight)					Value (Current \$000s)					Value (1972 U.S. \$000s) ¹				
	Groundfish ¹	Scallops	Lobster	Other ²	Total	Groundfish ¹	Scallops	Lobster	Other ²	Total	Groundfish ¹	Scallops	Lobster	Other ²	Total
Total															
1977	133,144	63,263	10,365	116,493	323,165	75,019	27,718	40,749	29,493	172,979	53,566	19,792	29,096	21,059	123,512
1978	173,528	65,757	11,214	141,915	366,607	94,379	44,145	45,671	43,987	228,182	62,744	29,348	30,362	29,243	151,697
1979	146,134	60,619	12,190	162,522	381,465	105,937	54,490	50,406	54,349	265,182	64,825	33,344	30,844	33,257	162,270
1980	167,483	63,102	11,749	189,082	431,434	115,295	64,404	50,958	61,975	292,632	64,540	36,052	28,526	34,693	163,811
1981	160,989	74,224	11,852	156,669	403,734	130,143	79,092	55,948	48,397	313,580	66,566	40,454	28,616	24,754	160,391
Northeastern Portion of Georges Bank															
1977	15,893	3,391	169	365	19,818	12,409	1,780	782	733	15,703	8,860	1,271	558	523	11,212
1978	17,485	10,703	231	1,369	29,788	13,857	6,927	1,086	3,462	25,332	9,212	4,605	722	2,302	16,841
1979	18,618	13,598	180	1,141	33,537	15,845	12,590	845	3,137	32,417	9,696	7,704	517	1,920	19,837
1980	17,609	15,425	138	714	33,887	14,511	16,504	698	1,953	33,665	8,123	9,239	390	1,093	18,845
1981	25,482	39,119	195	708	65,704	20,999	41,492	1,165	1,390	65,046	10,741	21,222	594	711	33,270

¹Groundfish includes the species of cod, haddock, flounder, yellowtail, pollock, redfish, hake, and whiting.

²Other² species are defined as those not included in the above definition of groundfish, scallops, or lobster. This category does include a number of species traditionally defined as groundfish.

³The value added in 1972 U.S. dollars was derived by dividing the value added in current U.S. dollars by 1.4005. See Appendix A, Table 3.

SOURCE: National Marine Fisheries Service (NMFS).

TABLE 16

**United States Catch By Species and Gear Type From
the Northeastern Portion of Georges Bank¹**

Quantity (Metric tons
Round Weight)

Species	Year	Gear Type			Total
		Otter Trawl	Scallop Dredge	Other	
Groundfish ²	1977	15,887.0	3.5	2.8	15,893.3
	1978	17,456.4	23.1	0.6	17,480.1
	1979	18,383.6	218.7	13.6	18,615.9
	1980	17,278.6	318.9	13.2	17,610.7
	1981	25,491.4	241.5	9.2	25,742.1
Scallops	1977	29.8	3,360.8	—	3,390.6
	1978	201.0	10,502.3	—	10,703.3
	1979	29.6	13,634.3	0.1	13,664.0
	1980	77.0	15,347.5	—	15,424.5
	1981	326.4	39,486.1	264.3	40,076.8
Lobster	1977	169.3	—	—	169.3
	1978	202.3	—	28.8	231.1
	1979	169.9	—	9.9	179.8
	1980	120.8	—	16.7	137.5
	1981	125.5	0.1	69.1	194.7
Other ³	1977	125.8	4.1	234.5	364.4
	1978	166.6	22.5	1,180.2	1,369.3
	1979	143.3	168.3	829.7	1,141.3
	1980	165.4	170.1	378.3	713.8
	1981	398.0	114.5	206.9	719.4
TOTAL	1977	16,211.9	3,368.4	237.3	19,817.6
	1978	18,026.3	10,547.9	1,209.6	29,783.8
	1979	18,726.4	14,021.3	853.3	33,601.0
	1980	17,641.8	15,836.5	408.2	33,886.5
	1981	26,341.3	39,842.2	549.5	66,733.0

¹ Reflects catch by all commercial vessels from ports in the states of Maine, Massachusetts, Rhode Island, New Jersey, Maryland, Virginia, and New Hampshire.

² Groundfish includes the species of cod, haddock, flounder, yellowtail, pollock, redfish, hake, and whiting.

³ "Other" species are defined as those not included in the above definition of groundfish, scallops, or lobster. This category does include a number of species traditionally defined as groundfish.

SOURCE: National Marine Fisheries Service (NMFS).

TABLE 17
Average Annual Price of Catch
By Species—Atlantic Canada

<u>Species</u>	<u>Year</u>	<u>Average Annual Price (Current Can. \$ per metric ton)</u>
Groundfish	1977	\$ 234.73
	1978	265.12
	1979	295.48
	1980	325.72
	1981	338.90
Sea Scallops	1977	377.34
	1978	580.25
	1979	831.97
	1980	971.96
	1981	1,111.11
Lobster	1977	3,174.68
	1978	3,941.34
	1979	3,883.85
	1980	3,983.07
	1981	4,227.27
Other	1977	188.57
	1978	277.90
	1979	334.74
	1980	370.25
	1981	360.00

SOURCES: Canadian Fisheries, *Annual Statistical Review*, Vol. 11, 1978, Table 28; Canadian Fisheries, *Annual Statistical Review*, Vol. 12, 1979, Table 28; Canadian Fisheries, *Annual Statistical Review*, Vol. 13, 1980, Table 29; Task Force on Atlantic Fisheries, *Navigating Troubled Waters*, 1982, p. 10.

Appendix F to Annex 4

STANDARD OF LIVING COMPARISONS

[Not reproduced]

Volume IV
ANALYTICAL ANNEXES

Annex 5

THE GEOMORPHOLOGY AND GEOLOGY OF THE GULF OF MAINE AREA*

INTRODUCTION

This Annex discusses the geomorphology and geology of the Gulf of Maine area, with particular regard to the differences between the presentations in the Memorials of the United States and Canada. The principal differences are those relating to the significance of certain geomorphological features. Chapter I of this Annex discusses the geomorphological setting, with brief references to the historical processes accounting for the present-day composition and shape of the seabed. That Chapter demonstrates that Georges Bank is an extension of the Atlantic Coastal Plain and East Coast Continental Shelf of the United States. It also shows that the Northeast Channel is a significant break in the surface of the seabed. Chapter II of this Annex examines the points of disagreement arising from the characterizations in the Canadian Memorial of certain subsurface geological features.

* Prepared on the basis of contributions from Drs. John S. Schlee and Kim D. Klitgord, of the United States Geological Survey, and Drs. Elazar Uchupi and K.O. Emery, of the Woods Hole Oceanographic Institution.

CHAPTER I

GEOMORPHOLOGY

1. In its Memorial, Canada states that "it is possible to recognize" four broad "physiographic provinces" of the continental shelf of eastern North America¹. Physiographic provinces are areas of the seabed divided on the basis of the shape of the seabed and the depth of the water. The four provinces identified in the Canadian Memorial are the Scotian Shelf, Georges Bank, the Gulf of Maine, and the East Coast Shelf. The Canadian Memorial bases its division of the continental shelf upon "areas within which there is a fair degree of physical similarity".

2. A division based upon "a fair degree of physical similarity" in the physiography of the area may be appropriate and useful for some purposes². Thus, for simple descriptive purposes, the United States has referred in its Memorial to such physiographic areas as "Georges Bank" and the "East Coast Continental Shelf". More comprehensive criteria may be used, however, to divide areas of the seabed on a more refined basis into "geomorphological provinces". These criteria include: (1) the historical origins of the seabed; (2) the development and present-day shape of the seabed and the composition of the materials comprising that seabed; and (3) the location of natural, readily discernible boundaries between geomorphologically different areas of the continental shelf.

3. The division of the seabed of the East Coast Continental Shelf of North America on the basis of the first of these criteria results in two major geomorphological provinces. These extend from Florida to New York and from New York to Newfoundland. The remaining criteria may then be used to divide the province stretching from New York to Newfoundland into two distinct subprovinces, separated by a prominent geomorphological boundary, the Northeast Channel. All of these criteria demonstrate that Georges Bank is the extension of the Atlantic Coastal Plain and East Coast Continental Shelf of the United States.

¹ Canadian Memorial, para. 67.

² Such criteria have proven useful in the preparation of studies of the physiography of the Atlantic continental shelf prepared for the United States Department of the Interior and in environmental impact studies prepared by that Department in connection with the sale of oil and gas leases in the Gulf of Maine area by the United States. E. Uchupi, *Atlantic Continental Shelf and Slope of the United States—Physiography*, Geological Survey Professional Paper 529-C, 1968; see also Draft and Final Environmental Impact Statements for Outer Continental Shelf Lease Sales No. 42 and No. 52; materials previously deposited with the Court pursuant to Article 50(2) of the Rules of Court.

SECTION 1. The historical origins of the materials comprising the seabed indicate that there are two major geomorphological provinces of the North American Atlantic Continental Shelf

4. The historical origins of the materials comprising the seabed of the North American Atlantic continental shelf divide the area into two major geomorphological provinces. The first major province consists of the area of continental shelf extending from Florida to New York¹. This area of continental shelf is covered by a layer of sediments deposited by rivers that washed the sediments off the adjacent mainland. The result is a broad, smooth, and essentially continuous continental shelf that descends gently seaward to the continental slope. The second major province consists of the area of continental shelf extending from New York northeastward to Newfoundland, including the Gulf of Maine area. The uppermost layers of sediment covering this area of the continental shelf have been deposited by glacial and, to a lesser extent, fluvial activity. On the basis of these historical origins, it is possible to divide the North American east coast continental shelf into a "non-glaciated shelf province" from Florida to New York and a "glaciated shelf province" from New York to Newfoundland.

SECTION 2. The Continental Shelf from New York to Newfoundland may be subdivided into two subprovinces based upon the respective types of glacial activity

5. The "glaciated shelf province" extending from New York to Newfoundland may be divided further into two subprovinces, based upon the type of glacial activity to which the seabed was subjected. Each of these subprovinces possesses a distinctive geomorphology. The character and shape of the seabed in those areas that received "glacial outwash", or *sediments deposited by the runoff from the front of the ice sheet*, differ substantially from that of the seabed over which the glacier moved.

2. The first of the subprovinces in the "glaciated shelf province" includes the area of the continental shelf that has not been glacially eroded. It extends from New York northeastward to the Northeast Channel. The surficial sediments covering this area of the shelf are composed primarily of glacial outwash. These sediments contain fine-grained material, primarily sand and, in several local areas, beds of gravel intermixed with sand. These materials originally formed a broad, smooth plain lying in front of the ice sheet and exposed above sea level. That plain extended along the present shoreline from New York to the northeast and thence as a peninsula over the area that is now Georges Bank. Subse-

¹ This shelf extends northeastward from Cape Canaveral, Florida. South of the Cape is a narrow stretch of shelf composed primarily of carbonate rock.

quently, the melting of the polar ice cap and the retreat of the glaciers caused the sea to advance and to inundate the area. This advance of the sea, together with tides and currents, reworked the sands and the gravel beds on the plain off Nantucket Island and on Georges Bank into the extensive linear ridges, shoals, waves, and other dunelike configurations present today. Figure 1.

142 7. The second subprovince is characterized by a distinctive, irregular topography that is the result of the ice sheet having moved across the shelf. In the Gulf of Maine area, this subprovince includes the Gulf of Maine Basin and the Scotian Shelf. As the glacier moved, it eroded the softer, less resistant sedimentary rocks, creating basins and other depressions, while leaving the harder rock as a series of ridges and other elevated, or "high", features. The glacier also deposited on this eroded surface much of the material it picked up during the course of its movement. This material, called "glacial till", consists of coarse, poorly sorted sediments, including mud, rock fragments, and even boulders. Today, the result of this glacial erosion is a continental shelf with a surface that is much more rough-hewn, uneven, and deeper than that of the continental shelf to the south and west.

8. In the Gulf of Maine Basin, there are many ridges, knolls, ledges, and other high features, with basins of varying depths interspersed among them. The high features cover some 70 per cent of the seafloor, the basins the remainder. The northern and eastern areas of the Basin are especially irregular, as there is little sediment covering the eroded shelf.

9. The Scotian Shelf, although larger in scale than the Gulf of Maine Basin, is geomorphologically similar. It can be divided into three zones: an inner coastal area of rocks with little or no sedimentary cover; a lowland area farther seaward comprised of small, isolated banks as well as basins and other depressions; and, on the seaward side, a chain of broad, flat-topped banks. Figure 2. None of these banks, with the exception of Sable Island Bank, has the extensive pattern of sandwave configurations that can be found on Georges Bank and the adjoining Nantucket Shoals¹.

10. In summary, the shape and character of the seabed of Georges Bank differs substantially from that of the Gulf of Maine Basin and the Scotian Shelf. This is because Georges Bank was an area formed primarily by the deposition of glacial outwash, while the Gulf of Maine Basin and the Scotian Shelf were formed primarily by glacial erosion. The result is that the shape and character of the seabed of Georges Bank resemble the continental shelf as far to the southwest as Long Island, a part of the shelf that was formed by the same glacial processes.

¹ It would appear that, from the location of Sable Island Bank on the seaward edge of the Scotian Shelf and from the exceptional nature of its sand configurations, the Bank occupies a small area of the Scotian Shelf over which the ice sheet did not advance.

SECTION 3. The Northeast Channel is a natural geomorphological boundary in the Gulf of Maine area

11. The Northeast Channel is a natural geomorphological boundary in the Gulf of Maine area because of its physical dimensions, and because of its status as a dividing line between distinctive geomorphological sub-provinces.

12. The Northeast Channel is the only significant break in the surface of the continental shelf in the Gulf of Maine area¹. It is to be contrasted with the Great South Channel, which is approximately one-third the depth of the Northeast Channel. Furthermore, while the Northeast Channel is deep enough to conduct the flow of water between the continental slope and the Gulf of Maine Basin, the Great South Channel is sufficiently shallow to act as a barrier to this deep flow. *See Figure 2.*

13. Quite apart from the prominence of its physical dimensions, the Northeast Channel serves as a natural geomorphological boundary between the two distinct subprovinces in the Gulf of Maine area. It forms the boundary between that part of the "glaciated shelf province" that includes the Scotian Shelf, formed primarily by glacial erosion, and that part of the province that includes Georges Bank, formed by the deposition of glacial outwash. *See Figure 2.* The Great South Channel, in contrast, does not separate two distinct subprovinces and, therefore, does not serve as such a geomorphological boundary.

14. This present-day difference in the nature of these two channels stems from their distinctive historical development. During a lowering of the sea level in the early Oligocene epoch (approximately 30 million years ago), most of the Gulf of Maine area was dry land. At that time, the two major drainage systems in the area reached the sea through what is now the Northeast Channel and the Great South Channel. Approximately 20,000 years ago, however, these drainage systems were subjected to different glacial activity.

15. As the ice sheet advanced southward, a tongue of the glacier moved through the Northeast Channel, eventually reaching the open sea at what is now the edge of the continental shelf. *See Figure 3.* This advance deepened and widened, or scoured the Northeast Channel. The subsequent retreat of the ice sheet left a layer of glacial till on the floor of the deepened Channel. The reworking of this glacial till since the retreat of the ice sheet resulted in the formation of rock fragments, and the floor of the Northeast Channel is covered today with rocks and boulders. Southwest of the Northeast Channel, the ice sheet apparently stopped its

¹ Using the figures contained in the Canadian Memorial, the maximum depth of the Great South Channel does not exceed about 80 metres, while the Northeast Channel is about 250 metres deep. Canadian Memorial, para. 23.

advance along the northern edge of the bank, or "cuesta", that is now Georges Bank. Farther to the southwest, the ice sheet moved into an embayment in the vicinity of the Great South Channel, but it did not advance across the breadth of the peninsula and reach the open sea, nor did it scour that Channel. The Great South Channel today, therefore, is filled largely with the glacial materials and other finer-grained sediments found on either side of the Channel, i.e., on Georges Bank and on the shelf off Nantucket and farther to the southwest.

16. Both the importance of the Northeast Channel as a geomorphological boundary and the historical connection of Georges Bank to the East Coast Continental Shelf and mainland of the United States are confirmed by the presence of numerous mammoth and mastodon teeth that have been found among the sediments on Georges Bank². The types of sediments in which these teeth have been found, together with radiocarbon dating of peat deposits and of mollusk shells in the sediments, furnish evidence that these animals existed on Georges Bank during a period when the Northeast Channel remained inundated. These animals must have migrated from what is now the United States, since the Northeast Channel would have presented an impenetrable barrier to migration from the area to the northeast.

¹ A "cuesta" is a hill, ridge, or bank with a steep slope on one side and a gentle slope on the other side. Georges Bank has a steep northern slope and descends seaward in a more gentle slope.

² F.C. Whitmore, Jr., K.O. Emery, H.B.S. Cook, and D.J.P. Swift, "Elephant Teeth from the Continental Shelf," in *Science*, Vol. 156, No. 3781, 1967, pp. 1477-1481.

CHAPTER II

GEOLOGY

17. The precise characteristics and interrelationships of the subsurface features of the east coast continental margin of North America can be determined with any degree of certainty only after more extensive deep exploratory drilling has been undertaken. This is particularly the case in the Gulf of Maine area. At present, the only deep drilling data from this area that have been available for extensive scientific study have come from two holes drilled on Georges Bank in 1976 as part of the United States Continental Offshore Stratigraphic Test (COST) program¹. Nevertheless, extensive geophysical studies² of the margin have been conducted, employing such inferential means of exploration as multichannel seismic reflection profiles and gravity and magnetic surveys. In combination with the available drill-hole data, these studies have provided information from which geologists in both the United States and Canada have inferred what they believe to be the major structural elements of the basement lying beneath the margin.

18. The United States and Canada agree with regard to the two fundamental characteristics of the subsurface geology, or basement structures, in the Gulf of Maine area. First, the subsurface geology is essentially continuous³; second, the trends of the major structural ele-

¹ The COST program involved a series of deep exploratory holes drilled throughout the east coast margin by a consortium of United States oil companies with the approval of the United States Geological Survey. Neither of the two holes drilled on Georges Bank was on the northeastern portion of the Bank. See United States Memorial, para. 95, n. 4.

² Geophysical techniques of exploration provide information about the velocity of sound waves transmitted through rocks, the shape of highly reflective surfaces within rocks, and the magnetic properties and densities of rocks. The nature, position, and relationships of rock structures are inferred from this information. See Figure 4.

³ The Canadian Memorial states:

"The geological history of the Gulf of Maine area is of interest to the extent that it helps to demonstrate the essential continuity and integrity of the Atlantic continental margin as it appears today." [para. 74.]

ments are parallel to the general southwest-to-northeast direction of the North American coast¹.

19. The Canadian Memorial, however, draws several conclusions regarding the subsurface structures that are not substantiated by the available evidence. None of these conclusions, however, refutes the underlying agreement of the Parties concerning the essential continuity of the *subsurface geology*.

SECTION 1. The Similarity of Basement Rocks Demonstrates the Essential Continuity of the Geological Structure Throughout the Gulf of Maine Area

20. The first disagreement between the Parties relates to the suggestion in the *Canadian Memorial* that the similarity of the rocks beneath Georges Bank and those of the Avalon Platform and Meguma group underlying the Nova Scotia landmass is evidence that the basement structure beneath the Nova Scotia landmass extends to Georges Bank. As Canada states:

"Rocks that *appear* to be part of the Avalon platform sequence were encountered at the bottom of one of the stratigraphic test wells drilled by a consortium of United States companies in the central part of Georges Bank in 1976, providing evidence of the seaward extension of the Avalon platform from the Canadian landmass to the area of Georges Bank. Moreover, *some* leading geologists consider that the basement rocks beneath *at least* the eastern portion of Georges Bank are *probably* part of the Meguma belt extending seaward from Nova Scotia²."

See the accompanying Figure 14 in the *Canadian Memorial*. In fact, it is impossible to assign any direction to the extension of the basement rocks beneath Georges Bank and the Nova Scotia landmass.

¹ For example, the *Canadian Memorial* states:

"... the Anomaly and the Basement Hinge Zone parallel each other throughout this portion of the Atlantic margin, and both run parallel to the general direction of the present-day Atlantic coastline and shelf edge from northeast to southwest". [para. 78.]

Similarly, the *Canadian Memorial* describes the northeast-southwest orientation of: the "grabens", or depressions in the crustal structure [para. 79]; the Cretaceous and Tertiary sedimentary strata [para. 80]; and the overlying sedimentary wedge [para. 83]. The *Canadian Memorial* also describes the stretching and pulling outward of the continental block supporting the continental landmass as occurring "in a direction roughly perpendicular to the contemporary North American Atlantic coastline" [para. 77].

² *Canadian Memorial*, para. 76. [Emphasis added; citations omitted.]

21. The problem with the Canadian contention lies not in the evidence itself, i.e., the similarity of the rock types, but in the conclusions that are drawn therefrom. In view of the fact that the subsurface structure of the entire east coast continental margin is essentially continuous, it is not surprising that there are similarities between the types of basement rocks at *any* two points along that structure. In fact, the types of rocks beneath Nova Scotia, the Gulf of Maine, Georges Bank, the continental shelf off Long Island, and the continental landmass of the United States are all similar. Thus, the basement rocks underlying Georges Bank are as closely related to the Long Island platform as they are to the Avalon platform or the Meguma belt of Nova Scotia.

SECTION 2. There Is No Consensus Concerning the Precise Limits of the Georges Bank Basin and the Scotian Basin in the Gulf of Maine Area

22. The Canadian and United States Memorials also disagree concerning the location of the limits of the two principal subsurface geological basins underlying the continental margin in the Gulf of Maine area, the Georges Bank basin and the Scotian basin. The Canadian Memorial states that the uplifted feature known as the Yarmouth arch represents a partial boundary between these two basins¹. Figure 16 in the Canadian Memorial thus depicts the Scotian basin as extending southwestward beneath the edge of Georges Bank. This description, however, does not comport with descriptions of the basins contained in prior studies in which Canadian geologists have participated.

23. Subsurface or geological basins are depressions that over the millenia have been filled with sediment that subsequently has been compacted. Geologists traditionally have determined the presence of such basins by measuring, primarily through the use of geophysical methods, the thickness of the sediments beneath the margin. It is difficult, however, to define through such inferential means the precise limits of subsurface features. It is a common practice among geologists to use a relatively distinct sedimentary feature, such as a carbonate ridge or other elongated, built-up deposit of compacted sediment, to define the limits of the subsurface basins underlying the east coast continental margin of North America.

24. The limits of the Georges Bank basin and of the Scotian basin are difficult to determine, because each basin in fact is an individually named part of an interconnected series of basins lying beneath the shelf and slope throughout the North American Atlantic continental margin. Both the United States and Canada define the seaward limit of the Georges Bank basin to be the "paleoshelf edge", or "reef ridge" as it is portrayed on

¹ Canadian Memorial, para. 86.

Figure 16 of the Canadian Memorial¹. This feature is a relatively prominent carbonate ridge that lies buried beneath the continental slope, running to the northeast under the seaward side of Georges Bank. In the vicinity of the Northeast Channel, the reef ridge swings landward. Northeast of the Channel, beneath Browns Bank, the ridge becomes less well-defined², and thus can no longer be viewed as the limit of the Georges Bank basin.

25. Canada apparently has used an area of salt domes, or "diapirs"³, called the "sedimentary ridge province", to define the seaward limit of the Scotian basin. See cross section A-A' of Figure 17 in the Canadian Memorial⁴. The sedimentary ridge province appears to be well-defined off the upper northeast coast of Nova Scotia. As with the reef ridge, the sedimentary ridge province swings landward in the vicinity of the Northeast Channel. Thereafter, it narrows significantly to the southwest of the Northeast Channel. Since the sedimentary ridge province is considerably less significant a feature in this area, it should not be considered as the limit of a major sedimentary basin southwest of the Northeast Channel.

26. The extensions of the Georges Bank basin and of the Scotian basin, therefore, should be limited to those areas where the carbonate ridge and the sedimentary ridge province, respectively, are well-defined. Accordingly, the Georges Bank basin is best described as underlying Georges Bank and extending northeastward to the Northeast Channel. The Scotian basin is best described as lying beneath the continental shelf and slope off Nova Scotia and extending southwestward no farther than the Northeast Channel.

27. This description of the Scotian basin is in consonance with that contained in an official publication of the Geological Survey of Canada. The Scotian basin is described in that publication as underlying "the

¹ It is noteworthy that Canada, on Figure 16, depicts the reef ridge as an apparent boundary between the Georges Bank basin and the Scotian basin, in the vicinity of the Northeast Channel.

² On Figure 16 of the Canadian Memorial, the dashed line outlining the reef ridge in the vicinity of the Northeast Channel apparently is an indication of the lack of definition in this area.

³ A diapir is a cylindrical body of less-dense rock, often salt, that heat and pressure have caused to pierce overlying layers of denser rock, forming a dome-shaped structure that projects upward through the overlying rock.

⁴ This province does not even appear on Canada's Figure 16, where there is no indication of the means used to define the seaward limits of the Scotian basin. It should also be noted that there is no discontinuity in the southwestward extension of the Georges Bank basin, as is portrayed on Figure 16.

eastern part of the Scotian Shelf and rise¹". A map included in that publication, reproduced here as Figure 5, comports with the textual description. Similarly, a 1981 article² written jointly by United States and Canadian geologists describes the Scotian basin as underlying the continental slope and rise off the upper northeast coast of Nova Scotia and the southern coast of Newfoundland³. An accompanying figure in the article, reproduced here as Figure 6, does not depict the Scotian basin as extending beneath Georges Bank.

SECTION 3. There Is No Evidence to Support a Belt of Seismicity Connecting the White Mountains to the New England Seamounts

28. Although the Canadian Memorial acknowledges the essential continuity of the geological structure of the east coast continental margin, it suggests that a continuous "belt of seismicity" extends from mainland mountains to the New England Seamount Chain, seaward of the continental shelf off Cape Cod. As Canada states:

"Scientists are not certain whether the seamounts are associated with an east-west basement fault south of Cape Cod ... or whether there is a relationship between the seamounts and a belt of seismicity that extends northwestward from the area seaward off Cape Cod through the White Mountains of New Hampshire and into western Quebec⁴."

Notwithstanding this uncertainty, Figure 15 of the Canadian Memorial depicts, without qualification, such a continuous belt of seismicity.

29. The United States does not agree with the Canadian contention that such a "belt of seismicity" extends offshore. Although there is evidence that a linear zone of earthquake activity exists onshore, from the area of the White Mountains of New Hampshire into western Quebec, there is no reliable evidence to support even the qualified Canadian suggestion that the belt of seismicity also extends offshore across Georges Bank. Indeed, the available evidence refutes the notion of such a belt. Although there has been occasional earthquake activity in the area of Georges Bank, very little of that activity has occurred offshore along the so-called belt of seismicity postulated by the Canadians. Finally, it is important to note that such a belt, even if it did exist, would not disrupt the essential continuity and northeastward trend of the geological structure of the continental shelf.

¹ L.H. King and B. MacLean, *Geology of the Scotian Shelf*, Canadian Hydrographic Service and the Geological Survey of Canada, 1976, p. 17.

² J.S. Schlee and L.F. Jansa, "The paleoenvironment and development of the eastern North American continental margin", in *Oceanologica Acta*, 1981, p. 71.

³ The Georges Bank basin is described as a series of basins lying between two stable basement platforms. These are the Long Island platform, to the southwest, and the LaHave platform, which lies to the northeast beneath the Scotian Shelf. *Ibid.*, p. 73.

⁴ Canadian Memorial, para. 81.

Annex 6

HYDROCARBON POTENTIAL BENEATH THE NORTHEASTERN PORTION OF GEORGES BANK*

INTRODUCTION

1. The Canadian Memorial estimates that the northeastern portion¹ of Georges Bank offers "a 40 percent chance of yielding at least 1,100 million [1.1 billion] barrels of oil and about 5.3 million million [trillion] cubic feet of gas². Canada then asserts that these estimates amount to approximately "one-sixth of Canada's remaining conventional reserves" of oil³. The Canadian estimates of the hydrocarbon potential of northeastern Georges Bank are inaccurate, and the extraordinary Canadian assertion concerning the purported contribution of those estimated hydrocarbons to existing Canadian reserves is exaggerated and misleading. The evidence currently available to the United States does not suggest that there are deposits of oil and gas beneath Georges Bank of the magnitude claimed by Canada. Moreover, Canada has compared different categories of hydrocarbon resource estimates in calculating the contribution that any oil from the Georges Bank area purportedly would make to Canada's energy reserves.

SECTION 1. Canada Has Exaggerated the Prospects for Discovering Oil and Gas Beneath Georges Bank

2. Canada estimates that there is a "40 percent chance"³ that the northeastern portion of Georges Bank contains at least 1.1 billion barrels of oil and about 5.3 trillion cubic feet of gas. Current United States mean estimates for the *entire* Georges Bank, termed the "North Atlantic region", are only 0.4 billion barrels of oil and 2.5 trillion cubic feet of gas⁴.

* Prepared on the basis of contributions from Charles D. Masters, Chief World Energy Resources Program, United States Geological Survey.

¹ The Canadian Memorial apparently uses the term "eastern half" in describing the area that the United States has defined as the northeastern portion of Georges Bank.

² Canadian Memorial, para. 86.

³ The formulation of a "40 percent chance" reflects essentially the same probability that there are petroleum resources in a given area as that of an "average expectation", used in previously published estimates of the Canadian Geological Survey, and that of a "mean", or most likely estimate, used by the United States Geological Survey.

⁴ *Estimates of Undiscovered Recoverable Resources of Oil and Gas in the United States*, United States Geological Survey, Circular 860, 1981, p. 78. Pertinent portions of this report are reprinted at Appendix A.

3. Canada based its estimates of 1.1 billion barrels of oil and 5.3 trillion cubic feet of gas upon a comparison of the thick sediments underlying Georges Bank "with the known geological parameters in the Sable Island area off Nova Scotia, where several significant oil and gas fields have been identified". The presence of thick sediments beneath both Georges Bank and the Scotian Shelf near Sable Island is not in itself, however, an indication of comparable hydrocarbon potential sufficient to support Canada's estimates.

4. The overall conditions for the generating and trapping of hydrocarbons beneath Georges Bank differ from those beneath the Scotian Shelf. The sedimentary rocks underlying the Scotian Shelf, particularly in the area near Sable Island, comprise ancient buried deltas, which contain carbon-rich materials carried off the mainland by the drainage of rivers. Subsequently, offsetting faults have fractured these ancient deltas, creating structures that have been shown to trap large deposits of natural gas². No structures similar to these deltas have been found beneath Georges Bank.

5. The results of drilling conducted by the United States on the southwestern portion of Georges Bank have provided no evidence of proven resources of oil or gas. Eight holes have been drilled to date on this portion of Georges Bank. Although this drilling has resulted in the recognition of some structures that are necessary to trap deposits of hydrocarbons, it has not produced evidence of the sedimentary "source beds", the structures that are necessary to yield the hydrocarbons that drain into those traps. No drilling has been conducted by either the United States or Canada on the northeastern portion of Georges Bank.

¹ Canadian Memorial, para. 86. The Canadian Memorial asserts that the Scotian basin extends beneath Georges Bank. As discussed in Annex 5, The Geomorphology and Geology of the Gulf of Maine Area, this is inconsistent with descriptions of the Scotian basin previously published by Canadian geologists.

² The latest available estimates published by the Government of Canada, dated March, 1981, indicate that the Venture discovery off Sable Island contains deposits of natural gas "probably exceeding one trillion cubic feet", based upon one successful well. See "Potential Evaluation", in *Canada's Conventional Oil and Gas Resources*, Geological Survey of Canada, Open File 767, March 1981, pp. 10-14, at Annex 38, Vol. II, of the United States Memorial and cited at para. 23, n. 4, of the United States Memorial. The Canadian Geological Survey has described the Venture discovery as signalling a "major gas province". *Ibid.* As of February, 1983, there were six drilling rigs operating in Nova Scotia waters, and Mobil Oil Canada, Ltd., has announced that it would proceed to develop natural gas from the Venture field. *Nova Scotia Benefits from Offshore Oil and Gas*, Nova Scotia Dept. of Development, 1983, pp. 1, 11, and 12. Although official revised estimates of natural gas reserves have not been published, it reasonably can be expected that estimates for this area eventually will amount to two or more trillion cubic feet.

SECTION 2. Canada's Estimate of the Possible Contribution of Northeastern Georges Bank to its Energy Reserves is Exaggerated and Misleading

6. Canada asserts that its estimates for the northeastern portion of Georges Bank "amount to approximately one-sixth of Canada's remaining conventional reserves". The Canadian Memorial does not describe the manner in which it arrived at this conclusion.

7. Canada has used two different categories of resource estimates in comparing the resource potential of northeastern Georges Bank with that of Canada. Inasmuch as there has been no drilling on the northeastern portion of Georges Bank, the Canadian estimates for oil and gas for that area necessarily must represent *undiscovered* resources. Estimates of undiscovered resources are the most speculative category of hydrocarbon estimates². Canada has compared its estimate of undiscovered oil resources, however, to its "remaining conventional reserves" of oil, a more established category of resources. Conventional reserves reflect estimates of *discovered* accumulations of hydrocarbon resources, all of which are specifically identified and considered to be economically recoverable³. As such, they are the most definite and established category of hydrocarbon resources. Canada, therefore, has compared speculative estimates of undiscovered resources to estimates of measured reserves.

8. A more complete and fair evaluation of the possible contribution of the undiscovered oil resources of the northeastern portion of Georges

¹ Canadian Memorial, para. 86.

² The United States Geological Survey defines "undiscovered resources" as follows:

"Resources, outside of known fields, estimated from broad geologic knowledge and theory."

Circular 860, *supra* para. 2, n. 4, p. 7. Estimates of hydrocarbon resources are grouped by the United States Geological Survey into categories that reflect two basic criteria: (1) geologic or other purely physical factors that determine the certainty with which a resource pool may be identified; and (2) whether an identified pool is recoverable in terms of current economic and technological factors. See *Principles of Resource/Reserve Classification for Minerals*, United States Geological Survey, Circular 831, 1980, reprinted at Appendix B. Figure 1 is a diagram depicting the various categories of hydrocarbon estimates used by the United States Geological Service in accordance with these criteria.

³ Although the Canadian Memorial does not define the term "conventional reserves", it apparently is equivalent to "measured reserves", which are defined as follows by the United States Geological Survey:

"That part of the economic identified resource that is estimated from geologic evidence supported directly by engineering measurements."

Circular 860, *supra* para. 2, n. 4, p. 7.

Bank to the oil reserves of Canada would compare the undiscovered potential resources of that part of Georges Bank to the ultimate recoverable resources of oil for all of Canada. That figure comprises undiscovered resources, proven reserves, and cumulative production for all of Canada. According to the most recent available report published by the Geological Survey of Canada, in March of 1981, the ultimate recoverable resources of Canada are estimated to amount to 40.3 billion barrels of oil ¹.

9. Thus, the Canadian estimate of 1.1 billion barrels of oil on Georges Bank in fact represents at most some 2.7 per cent of the present estimates of the ultimate recoverable oil resources of Canada ². If the United States estimate of 0.4 billion barrels of oil for all of Georges Bank is more accurate, then whatever oil may be beneath the northeastern portion of Georges Bank represents considerably less than 2.7 per cent of the present estimates of the ultimate recoverable oil resources of Canada.

10. In the event that there are in fact deposits of oil or gas in the Georges Bank area, New England is both in need of and able to use these resources. The more populous and mature economy of New England creates a great demand for hydrocarbon resources. There have been no commercially exploitable discoveries of oil or gas anywhere along the entire east coast of the United States.

¹ Open File 767, *supra* para. 4, n. 2, p. 26. This estimate does not differentiate between onshore and offshore reserves, as do United States estimates.

² Since the publication of those estimates, moreover, there have been additional appraisal wells drilled on the Hibernia structure off Newfoundland, and a Canadian corporate official has reported that the results from these wells indicate the presence of a major oil accumulation. Abstract of presentation by R.J. Butot of Mobil Oil Canada, Ltd., "The Hibernia Structure", in *American Association of Petroleum Geologists, Bulletin*, Volume 65/9, Sept. 1981, p. 1659.

Appendix A to Annex 6

U.S. BUREAU OF MINES AND THE U.S. GEOLOGICAL SURVEY, "PRINCIPLES OF A
RESOURCE/RESERVE CLASSIFICATION FOR MINERALS", GEOLOGICAL SURVEY
CIRCULAR 831, 1976

[Not reproduced]

Appendix B to Annex 6

DOLTON, CARLSON, *ET AL.*, "ESTIMATES OF UNDISCOVERED RECOVERABLE
CONVENTIONAL RESOURCES OF OIL AND GAS IN THE U.S.", GEOLOGICAL SURVEY
CIRCULAR 860, 1981

[Not reproduced]

Annex 7

COMMENTS ON PARAGRAPHS 179-196 OF THE CANADIAN MEMORIAL

A. THE NINETEENTH CENTURY

179. The central position of Georges Bank in the Nova Scotia fishery is the product of a long evolutionary process. Canada's presence on the Bank had its beginnings in the nineteenth century and attained its present level of importance after World War II.

1. **Comment:** Canada had no fishery on Georges Bank in the 19th century, and has offered no evidence to prove otherwise. Perhaps the best evidence that there was no Canadian fishery on Georges Bank in the 19th century is the writings of Canada's most eminent authority in this field, Harold A. Innis. His work, *The Cod Fisheries: A History of an International Economy*, has been relied upon by both Canada and the United States in their Memorials, and has been made available to the Court in its entirety¹. It is an exhaustive study of the fisheries of the Northwest Atlantic prior to 1936. Innis makes no mention whatsoever of any Canadian fishery on Georges Bank.

2. Canadian fishing on Georges Bank in the 19th century was at most isolated and insignificant. Insofar as the United States is aware, the only evidence of any Canadian vessel fishing on Georges Bank in the 19th century is the statement contained in the reports of the Halifax Commission in 1878 that one Canadian fishing vessel had fished there. That incident is noted in the United States Memorial².

¹ H. Innis, *The Cod Fisheries: A History of an International Economy*, 1940. See *United States Memorial*, para. 65, and Annex 13, Vol. II; and *Canadian Memorial*, Annexes, Vol. I, I, p. 182. Canada submitted the full text of this book to the Court in its deposit of materials on 27 September 1982, pursuant to Article 50(2) of the Rules of Court.

² *United States Memorial*, para. 72, n. 1

180. The extent of the early Canadian fishery is incapable of exact measurement. There are a number of factors that rule out any precision in the reconstruction of the early character of the fishery — the natural reticence of skippers on the location of their best fishing grounds, the absence of the mandatory reporting requirements and elaborate bureaucracies that exist today to monitor the industry, and the hazards to which local archives are inevitably exposed. The evidence is often sketchy until the systematic collection of statistics on the location and quantities of catches was first begun in recent years; but within these limitations, at least some of the broad historical patterns can still be discerned with reasonable clarity.

3. **Comment:** Fishery statistics have been kept in Canada since Confederation¹. This paragraph constitutes an admission that there is no direct evidence that a Canadian fishery existed on Georges Bank in the 19th century.

181. The New Englanders probably appeared first on Georges Bank in the 1830s, though it is not clear to what extent these initial efforts involved the eastern sectors of the Bank. Canadians also frequented Georges Bank in the nineteenth century. In 1867, the year of Confederation, a *Report on the Fisheries of Nova Scotia* by Thomas F. Knight indicated that "The most westerly bank to which our fishermen repair is St. George's Bank", a "favourite resort" of United States fishermen as well because of its large extent⁴³. At about the same time, on 19 February 1868, a report from the Department of Marine and Fisheries office in Halifax to the Minister of Marine and Fisheries in Ottawa gave a general overview of the state of the Nova Scotia fisheries. After reviewing the state of the river fisheries, the report went on to indicate that Nova Scotia occupied "the first place among the Provinces of the Dominion in the extent and value of the Sea Fisheries", and described the banks of Nova Scotia within 5 to 20 nautical miles of the coast. It then added: "Besides these there are others at a greater distance from the coast, among which the most important are St. George's, La Have, Sable, Sambro, and St. Pierre Banks⁴⁴."

⁴³ Thomas F. Knight: *Report on the Fisheries in Nova Scotia*. Halifax, A. Grant, 1867, p. 3. Georges Bank was often referred to at this time, at least in Nova Scotia, as St. George's Bank, an appellation that appeared on some of the early charts. See Annexes, Vol. II, Annex 1.

⁴⁴ Letter from Mr. H. W. Johnston, Department of Marine and Fisheries, Halifax, to the Honourable P. Mitchell, Minister of Marine and Fisheries, Ottawa, 19 February 1868, records of the Nova Scotia Department of Fisheries, Public Archives of Nova Scotia, RG 15, Vol. 26, No. 14647, p. 7. See Annexes, Vol. II, Annex 2.

¹ In 1951, Canada reported to ICNAF its catches in Subarea 4 dating to 1869 and its catches off Newfoundland dating to 1804. It reported no catches in Subarea 5. See Part 4, "Statistics of Landings of Groundfish from the Convention Area", pp. 35-68, ICNAF, *Second Annual Report*, 1951-52, at Annex 16, Vol.V.

4. **Comment:** As shown in the United States Memorial, at paragraphs 68 through 72 and in its supporting materials, United States fishermen from New England were the first to fish on Georges Bank. Moreover, as shown in Part I, Chapter IV, Section 3, of the United States Counter-Memorial, those fishermen regularly fished on the northeastern portion of Georges Bank.

5. Canada attempts to prove the existence of a 19th century Canadian fishery on Georges Bank by references to the Knight report and to the Johnston letter, which include Georges Bank in a list of the fishing banks of the Northwest Atlantic. Those reports, however, do not indicate that Georges Bank was fished by Canadian fishing vessels.

6. Canada has included the first three pages of the Knight report in the Annexes to its Memorial, at Volume II, Annex 1, and has quoted from page three of the report. The entire 28-page report and its accompanying tables and appendix, however, provide a complete description of the fisheries of Nova Scotia, and make no further mention of Georges Bank¹. The only conclusion that can be drawn is that there was no established Canadian fishery on Georges Bank during the period. The remark from the Knight report that Canada has cited is evidence of nothing more than the possibility that there were incidental occasions when a Canadian vessel fished on Georges Bank in the 19th century, or that Canadian fishermen occasionally sailed as crew members aboard United States vessels sailing from New England ports.

7. The second piece of evidence relied upon by Canada is a letter from one Mr. Johnston, Department of Marine and Fisheries, Halifax, to the Minister in Ottawa². This is even more attenuated and less convincing as evidence of a Canadian fishery on Georges Bank than is the Knight report, upon which the letter would seem to have been based. The letter gives no indication that Canadian fishing vessels went to Georges Bank. In fact, the letter reasonably may be interpreted as an admission that Canadian fishermen did not fish on Georges Bank. In quoting from this letter, Canada has omitted a key sentence:

“These fisheries are pursued along the whole coast line of the Province, *on the nearest banks*, and to a great extent in the Gulf of St. Lawrence³.”

¹ Canada submitted the full text of this report to the Court in its deposit of materials on 27 September 1982.

² For the text of the letter, see the Canadian Memorial, Annexes, Vol. 2, Annex 2. It should be noted that the text of the letter appearing in Vol. 2, Annex 2, and as submitted to the Court in Canada's deposit of materials on 27 September 1982, omits 5 pages.

³ *Ibid.*, page 6 [Emphasis added.]

After a discussion of these nearest banks—"banks extending along the Nova Scotia coast"—the letter lists the offshore banks of the Northwest Atlantic, including Georges Bank. The letter therefore is nothing more than an indication that Nova Scotia officials were aware that Georges Bank was a fishing bank of the Northwest Atlantic.

182. The southwestern fishing grounds of Nova Scotia, which include Western, La Have, Browns, and Georges banks, took on a growing importance for Canadian fishermen in the last quarter of the nineteenth century, as the southern mackerel fishery and the fresh fishery (*centred largely on haddock and so called to distinguish it from the salt cod fishery*) became lucrative pursuits. The proximity of these fishing grounds to the ports of southwest Nova Scotia was an important factor. The Pubnicos, Yarmouth and Lockeport, for instance, are between 90 to 104 nautical miles from the northeastern part of Georges Bank. The relative proximity of southwest Nova Scotia to the major markets in the United States was also a factor, and the two nineteenth-century periods of free trade in fish products between Canada and the United States (1854-1866 and 1871-1885) provided a major stimulus to the development in Canada of a distinct offshore fleet for the southwestern banks⁴⁵. Nova Scotians gradually developed a pattern of fishing that involved not so much exclusive reliance on a single area, but a systematic ranging over a sequence of banks — Georges, Browns, La Have and others — in an effort to capitalize on the opportunities as they arose from season to season. These grounds were of major importance in the diversification of the Nova Scotia fishing industry in the late nineteenth century into products other than salt cod.

⁴⁵ The Reciprocity Treaty of 1854 and the Treaty of Washington of 1871 provided for Canadian access to the United States market.

8. **Comment:** This paragraph implies that Canadian fishing vessels must have fished on Georges Bank, for the following reasons: some Nova Scotia ports are within 100 nautical miles of Georges Bank; there were periods of free trade in the 19th century; and, the Canadian fishing industry began to develop an offshore fleet. The Canadian offshore fleet in the 19th century, as today, was based primarily in Lunenburg. The fleet was small. It fished the banks of the Scotian Shelf and, on occasion, the Grand Banks. Canadian vessels did not fish regularly on Georges Bank. Since fish were plentiful on the Scotian Shelf, there was no reason for the fleet to range far from its home ports. The fact that certain Nova Scotia ports are within 100 nautical miles of Georges Bank certainly is not proof that vessels from those ports fished on the Bank. Furthermore, United States trade policies did not affect *where* Canadian fishermen fished.

B. 1900 TO 1945

183. During the first quarter of the twentieth century, fleets of schooners and steam trawlers from the southwestern ports of Nova Scotia were engaged in the year-round exploitation of several major groundfish species on the same sequence of fishing banks, including Georges. The growth of the fresh fish market in Boston and New York during these years helped to stimulate the expansion of Canadian activity on Georges Bank. The southwestern banks met nearly all the requirements of a complete fishing economy. The range of species they offered over the fishing year, beginning with haddock in the fall and winter, halibut in the late winter and spring, and cod and mackerel in spring and summer, made it possible for the Canadian fleet, subject to the constraints of supply and demand, to satisfy its markets in the West Indies (for salt cod), central Canada (smoked haddock), and New York and Boston (haddock and halibut). Vessels from southwest Nova Scotia carrying lobsters to Boston took groundfish on Georges Bank on their return voyages.

9. **Comment:** Canada offers no evidence to support the assertion that there was a Canadian fishery on Georges Bank in the years 1900 through 1945. Indeed, this assertion is contradicted by information made available to ICNAF by Canada. This information concerned Canada's fishing activities prior to the entry into force of that Convention, and is reported in ICNAF's *Second Annual Report*¹ and its *Statistical Bulletin* for 1952². The *Bulletin* presents "a descriptive summary of fishing . . . in the Northwest Atlantic. It includes figures on landings and where possible tables relating to fishing effort data"³. The 1952 *Statistical Bulletin* and *Second Annual Report* were prepared on the basis of information provided by the member States of ICNAF, including Canada. The Department of Fisheries in Ottawa; the Atlantic Biological Station in St. Andrews, New Brunswick; and the Newfoundland Fisheries Research Station, St. John's, Newfoundland, all contributed to the statistical information forming the basis of the *Bulletin* and the *Second Annual Report*⁴. Neither of these documents makes any reference to a Canadian fishery on Georges Bank or in Subarea 5.

184. Digby on the Fundy coast of Nova Scotia was one major centre of this fishery, especially the "finnan haddie" or smoked haddock trade that was aimed at both central Canadian and American markets. In 1914, the editor of the *Canadian Fisherman* described Digby's exploitation of the southwestern banks in the following terms:

"Digby's fishing skippers are celebrated for the big stocks in the fresh fishing and their 95 ton schooners, small enough for winter

¹ ICNAF *Second Annual Report*, *supra* para. 3, n. 3.

² ICNAF *Statistical Bulletin* [hereinafter *ICNAF Stat. Bull.*], Vol. 2, 1952, at United States Memorial, Annex 46, Vol. III.

³ ICNAF *Stat. Bull.*, Vol. 2, 1952. United States Memorial, Annex 46, Vol. III, p. 8.

⁴ ICNAF *Stat. Bull.*, Vol. 2, 1952, p. 8; ICNAF, *Second Annual Report*, 1951-52, p.36 Annex 16, Vol.V.

fishing compared with the big craft out of Boston and Gloucester, have made names for themselves among the trawlers from Georges to Western Bank⁴⁶."

Again, in 1916, a report carried in both the *Canadian Fisherman* and the *Digby Weekly Courier* predicted:

"If the haddock have not already started, they will soon begin to move away from the shores and for the next landings of any importance we shall likely have to depend on the off-shore vessels fishing on Brown's, Georges and Western Banks⁴⁷."

The same reliance on Georges Bank was indicated in many contemporary newspapers and other documents. In 1922, a story in the *Canadian Fisherman* acknowledged that the Maritime Fish Corporation — one of the largest firms in the fishery of the day — had chosen Digby for one of its two branches because of its proximity to a number of prime fishing grounds, including Georges Bank⁴⁸.

⁴⁶ F. William Wallace: "Haddocking on Brown's Bank." (*Canadian Fisherman*, Vol. I, No. 5, May 1914, p. 141.) See Annexes, Vol. II, Annex 3.

⁴⁷ "The Atlantic Fisheries. The Twelve Months' Tally: Digby, N.S." Special Correspondence. (*Canadian Fisherman*, Vol. III, No. 2, February 1916, p. 53.) See Annexes, Vol. II, Annex 5.

⁴⁸ Roy M. Whynacht: "Maritime Fish Corporation." (*Canadian Fisherman*, Vol. IX, No. 7, July 1922, p. 142.) See Annexes, Vol. II, Annex 6.

10. **Comment:** Notes 46 through 48, proffered in support of the contentions made in paragraph 184, do not indicate the existence of any Canadian fishery on Georges Bank. Note 46 refers to an article in the *Canadian Fisherman* magazine entitled "Haddocking on Browns Bank". As its title makes clear, the article discusses haddock fishing on Browns Bank, not on Georges Bank. Notes 47 and 48 refer to articles from the same magazine. These articles indicate only that Georges Bank was one of a number of fishing banks known to Canadian writers.

11. Frederick William Wallace, the author of the article "Haddocking on Browns Bank", was also for many years editor of the *Canadian Fisherman*. He had first-hand experience in the offshore fishery¹, and, after becoming editor of the *Canadian Fisherman* in 1913, he maintained close contacts with scientists, Canadian fishery managers, and the Canadian fishing industry. In 1945, he wrote an article entitled "Thirty Years Progress in Canada's Fish Industry 1914-1944", which was

¹ See Frederick William Wallace, *Roving Fisherman: An Autobiography Recounting Personal Experiences in the Commercial Fishing Fleets and Fish Industry of Canada and the United States 1911-1924*, 1955. Cited at Canadian Memorial, para. 187, n. 53, and submitted to the Court by Canada in its deposit of materials on 27 September 1982.

published in the *Canadian Fisheries Manual*¹. The article, although comprehensive and specific in its description of Canadian fisheries, nowhere mentions the existence of a Canadian fishery on Georges Bank. Portions of the article that concern Nova Scotia are submitted with this Annex as Appendix A; especially pertinent portions are presented here:

"In the year 1914, Lunenburg had 119 schooners in the deep-sea fisheries . . . Yarmouth county had 9 . . . Digby county had 5, Halifax county 4, Richmond county 3 and Shelburne 2. These vessels . . . prosecuted the cod, haddock and halibut fisheries on *all the offshore Banks from Browns to Grand*, and the inshore grounds from the Bay of Fundy to Labrador.

In 1914, all the schooners in the Lunenburg fleet were engaged in salt fishing . . . they operated on the various Banks to the eastward—Sable Island, Quero, St. Peter's, Grand Bank, and lesser grounds—splitting and salting the codfish caught, and bringing their fares home to be dried for export. None of the fleet did any fresh-fishing and the Lunenburg fishermen had no interest in such hazardous and dangerous work²."

"While the Lunenburgers were employing their vessels in the business of catching codfish and salting and drying them, the little fleet of schooners belonging to Digby, Yarmouth, Shelburne and the other ports, devoted their efforts, for the most part, to making catches for the fresh fish markets. They caught haddock, cod, hake, cusk, pollock and halibut on *Brown's, LaHave, and the nearer Banks* . . ."³.

"In 1914 and the succeeding years up to the 1930's there were not many Canadian vessels engaged in fresh-fishing offshore⁴."

12. Wallace also describes the United States haddock fishery off the Nova Scotia coast:

¹ Frederick William Wallace, "Thirty Years Progress in Canada's Fish Industry 1914-1944", in *Canadian Fisheries Manual*, 1945. Appendix A to this Annex contains pages 1 through 3, 6 through 14, 73 through 81, and 92 through 93 of this article.

² Wallace, p. 8. [Emphasis added.]

³ Wallace, p. 9. [Emphasis added.]

⁴ Wallace, p. 12.

"Within easy steaming distances of Nova Scotia ports, prolific haddock grounds are to be found but Nova Scotia fishermen do not catch all that are taken from the nearby banks. As a matter of fact, *American trawlers from New England ports fish the grounds from Banquereau south and west to Browns and take from them as many pounds of haddock as do the Canadian fishermen, perhaps more.* In the year 1935, for instance, Canadian fishermen caught 36,842,600 lbs. of haddock from adjacent banks and inshore waters. American fishermen, operating outside territorial limits off the Canadian coasts on the banks off Nova Scotia, caught around 40,000,000 lbs. in the same year. In 1937, New England trawlers caught over 146,000,000 lbs. of ground fish off Nova Scotia, or 38% of their total catch for that year. With the exception of Georges Bank and the grounds off the New England coast, which are showing signs of depletion in recent years, the most prolific sources of haddock are to be found on the banks paralleling the Atlantic coast of Nova Scotia, but without trawlers or the smaller 'draggers', *Canadians cannot fully exploit the haddock resources existing on their doorstep*¹."

13. Wallace also wrote the following about the smoked-haddock trade referred to at paragraph 184 of the Canadian Memorial:

"*Out of New England ports, fresh fishing for haddock in the winter months was inaugurated about the year 1850.* The fish were iced at sea and marketed in Portland, Gloucester and Boston. Nova Scotia, however, lacked the populated areas such as existed in the New England States, and it was not until 1876 that the completion of the Intercolonial Railway linked Nova Scotia with Upper Canada. While transportation was available then, many years passed before facilities for the carriage of fresh and lightly-smoked fish were afforded at rates that would encourage shipments from the Maritimes to Quebec, Montreal and Toronto.

Those cities provided a good market for haddock, but their supplies of fresh, frozen or smoked sea fish from the Atlantic ocean came from Portland, Maine, by sleigh transport in winter, and only regularly following the completion of the Grand Trunk Railway linking that port and Longueuil (across the river from Montreal) in 1853. . . . As a consequence, *the haddock disposed of in Montreal markets was imported from Maine and sold under the name of 'Portland Haddock'.* Importations of sea-fish from Portland, Boston, New York and other American points to

¹ Wallace, pp. 74-75. [Emphasis added.]

Quebec, Montreal, Toronto, and central Canadian towns and cities continued until well along in the 1900's, and it was not until 1907 that the Federal Department of Fisheries instituted a scheme of financial aid to offset the difference in express transportation rates on fresh and smoked fish between the shorter haul from Portland and Boston and the longer haul from Halifax and Saint John ¹."

"This financial assistance was carried out for a number of years until it was no longer necessary. Improved services and lower rates instituted by the Intercolonial (now Canadian National), and Canadian Pacific railways—both of which came to realize that fish transport was worthwhile catering to—resulted in the almost complete elimination of imports from the U.S. of the class of fish produced in the Maritimes, by the year 1915. Today, no haddock, cod, halibut, salmon, or Canadian fish in good supply, is imported into Canada from the United States. . . .

"As a matter of record, however, it should be mentioned that insofar as haddock is concerned, many distributors in Quebec and Ontario persisted in selling the Maritime Province's fish under the name of 'Portland Haddock' long after such imports ceased ²."

14. Thus, Frederick William Wallace, editor of the *Canadian Fisherman* magazine, the individual and publication cited by Canada throughout the section in the Canadian Memorial entitled "Historical Evolution of Canada's Presence in the Georges Bank Fishery", describes a Canadian offshore fishery much different from that portrayed in the Canadian Memorial. At no point in his 122-page article, "Thirty Years Progress in Canada's Fish Industry 1914-1944", does he mention Canadian fishing on Georges Bank. To the contrary, he states that the Canadian fishing industry was unable to exploit the resources on its very "doorstep", and that it was the United States that developed and supplied to Canada smoked haddock—"Portland Haddock"—until well into the 20th century.

185. The same pattern developed at other centres in southwestern Nova Scotia. The vessels of the Yarmouth and Pubnico fleets fished the sequence of southwestern banks, including Georges, Browns and La Have, as a matter of course, moving from one location to another to max-

¹ Wallace, pp. 73-74. [Emphasis added.]

² Wallace, p. 77.

³ Canadian Memorial, paras. 179-199.

imize their catch. This pattern is reflected in a casual newspaper notice from the *Yarmouth Times* in 1915, which reports on the annual dogfish runs encountered by a Yarmouth vessel, the *Eddie James*, on a ten-day trip during which she —

“... covered a good deal of ground but everywhere found the waters swarming with dogfish. She fished first on the southeast part of La Have Bank then had a try on George’s, and again off Cape Sable, finishing up on the Grand Manan Bank⁴⁹”.

It was a common practice in the Yarmouth and Pubnico fleets to fish on Georges Bank when the annual dogfish “pestilence” was particularly bad on the other southwestern banks.

⁴⁹ “Shipping and Fishing.” (*The Digby Weekly Courier*, Friday, 25 June 1915.) See Annexes, Vol. II, Annex 4.

15. **Comment:** This single newspaper article from the *Digby Weekly Courier*, if indeed it is accurate, would indicate that one Canadian vessel fished, in passing, on Georges Bank—and even then only because fishing was “particularly bad” in its accustomed fishing areas. The fact that Canada is forced to rely upon such an isolated source demonstrates more forcefully than could any source the United States might provide the insignificance of Canada’s encounters with Georges Bank until the mid-1950s.

186. Liberal trade policies in effect in the United States from 1913 to 1922⁵⁰ provided a major stimulus to the export of fresh and mildly cured fish from the ports of southwest Nova Scotia. Together with the Hazen-Redfield pact (1918-1921), which allowed direct landings by Canadian fishing vessels in United States ports, these liberal policies led to increased Canadian use of Georges Bank. Although the imposition of a new tariff by the United States in 1922 curtailed Canadian access to American markets, Nova Scotian fishing patterns on the southwestern banks persisted, albeit at reduced levels and lower profits⁵¹. The 1928 *Report of the Royal Commission Investigating the Fisheries of the Maritime Provinces* included Georges Bank in a list of what it described as “the principal fishing grounds of the North Atlantic, resorted to by fishing-vessels and steam trawlers from the Atlantic ports of Canada, and by vessels and steam trawlers from other countries⁵²”.

⁵⁰ The Underwood Tariff of 1913 removed the three quarters of a cent per pound tariff on Canadian fish.

⁵¹ *Royal Commission Investigating the Fisheries of the Maritime Provinces, Proceedings*. Ottawa, King’s Printer, 1927-1928, Vol. 9, p. 3432 and Vol. 10, p. 3476. See Annexes, Vol. II, Annex 7.

⁵² *Report of the Royal Commission Investigating the Fisheries of the Maritime Provinces and the Magdalen Islands*. Ottawa, King’s Printer, 1928, p. 7. See Annexes, Vol. II, Annex 8.

16. **Comment:** Notes 50, 51, and 52 do not indicate that Canadian fishing vessels fished Georges Bank. Liberal United States trade policies

in the 1920s did not mean that Canadian vessels fished off the United States coast and landed their catch in the United States. The proceedings of the Royal Commission, cited at note 51, are over 670 pages in length, yet contain no information to support the proposition that Canadian fishermen fished on Georges Bank. The quotation from the Royal Commission Report contained in the last sentence of paragraph 186 is only the now-familiar "list" of the fishing grounds of the Northwest Atlantic, which of course includes Georges Bank.

187. During periods when United States markets were protected by a tariff barrier, some Nova Scotia entrepreneurs adopted a practice of acquiring American flag vessels and continuing their registration in the name of an American owner who often had little more than a nominal ownership interest. These vessels very often sailed out of Nova Scotia ports and were substantially if not entirely crewed by Canadian seamen, and thus conducted themselves in a manner largely indistinguishable from Canadian registered vessels. The use of an American registry became in effect a "flag of convenience" device allowing the direct marketing of the catch in the United States. At times, therefore, the *de facto* Canadian fleet significantly exceeded the *de jure* Canadian fleet, though the difference in size cannot now be precisely determined, so many years after the events in question⁵¹.

⁵¹ Frederick William Wallace: *Roving Fisherman. An Autobiography Recounting Personal Experiences in the Commercial Fishing Fleets and Fish Industry of Canada and the United States 1911-1924*. Gardenvale, Quebec, Canadian Fisherman, 1955, pp. 12 and 101.

17. **Comment:** As a matter of law, the distinction between a "*de jure*" and a "*de facto*" fleet is certainly novel. As an issue of fact, however, only vessels built in the United States, with a United States citizen as captain, could be used in the manner indicated. The autobiography of Frederick William Wallace, the editor of *Canadian Fisherman* magazine, which is cited in support of paragraph 187, is 512 pages long. It mentions only four vessels used in this manner: the *Quickstep*, the *Effie M. Morrissey*, the *Harvester*, and the *Samuel R. Crane*¹. Thus, the statement in paragraph 187 that "the *de facto* Canadian fleet significantly exceeded the *de jure* Canadian fleet" strains credibility. The autobiography makes no mention of "*de facto*" Canadian vessels fishing on Georges Bank.

18. For purposes of this case, the most interesting aspect of the autobiography of Frederick William Wallace is that, throughout its entire 512-page length, it never mentions a Canadian fishery on Georges Bank. The few passing references in the book to Georges Bank relate either to the familiar list of the fishing banks of the Northwest Atlantic² or to fishermen's tales of unspecified nationality that refer to Georges Bank³.

¹ Wallace, *Roving Fisherman*, *supra* para. 11, n. 11, pp. 12 and 101.

² Wallace, *Roving Fisherman*, p. 135.

³ *Ibid.*, p. 198.

Although Wallace does not refer to a Canadian fishery on Georges Bank, he does recall the view of one Canadian as to where a fair boundary between the United States and Canada might be located:

"With a horny hand outspread and the forefinger of the other tracing the clauses of an imaginary treaty upon it, he declared solemnly; 'What I propose is this. Let the Americans agree to quit fishing' north of Browns . . .".

188. The 1920s and 1930s were apparently marked by a decline in groundfish activity by Canadian schooners and trawlers on Georges Bank, though schooner-and-dory fishermen from Canada continued to operate on the Bank through these years. The reasons for this decline included the cancellation of the Hazen-Redfield pact in 1921 and the imposition of the prohibitive Fordney Tariff of 1922. At the same time, Canadian government policy itself sought to restrict the offshore steam trawler component of the Canadian industry. Regulations flowing from the recommendations of the 1928 Royal Commission on the Maritime Fisheries (which had concluded that the large catches of trawlers tended to glut fish markets and thus to depress the prices paid to inshore fishermen) had a severe impact on the offshore fleet. Canadian trawlers were subjected to prohibitive licence fees⁵⁴. Largely as a result of this legislation, the number of trawlers in Atlantic Canada declined progressively.

⁵⁴ *Steam Trawler Order*, P.C. 2196, 30 October 1929. See Annexes, Vol. II, Annex 9.

19. **Comment:** This paragraph seeks to explain the decline of a fishery that never existed.

189. The contraction of world markets during the Great Depression affected United States as well as Canadian entrepreneurs, and the 1930s saw a general decline both in the supply of groundfish and in fishing activity on Georges Bank. During this period, more of Canada's offshore fishermen turned their attention to the swordfish fishery, which had been conducted on Georges Bank by Nova Scotian vessels from the early years of the present century. In the 1930s it became an important industry in which Canadian fishermen were the leading producers⁵⁵. It complemented the groundfish fishery, as these two activities were often pursued seasonally by the same vessels. Even after the outbreak of World War II, the swordfish fishery on Georges Bank continued: thus, for example, in 1942 the *Lucille M* of Yarmouth, with 1.6 metric tons of swordfish in its hold, was sunk on Georges Bank by a submarine⁵⁶. Some of the pioneers of the Canadian offshore scallop fishery in the post-war period were outfitted for swordfish as well, and the latter fishery may in a sense be regarded as a precursor of the present scallop industry.

⁵⁵ S. N. Tibbo, L. R. Day and W. F. Doucet: *The swordfish (Xiphias Gladius L.). Its life-history and economic importance in the northwest Atlantic*. Ottawa, Fisheries Research Board of Canada, Bulletin No. 130, 1961, p. 20.

⁵⁶ Wreck Report, File: East Coast *Lucille M*, 26 July 1942, Records of the Department of Transport, Public Archives of Canada, RG 12, Vol. 887. See Annexes, Vol. II, Annex 10.

¹ Wallace, *Roving Fisherman*, pp. 24-25.

20. **Comment:** United States catches on Georges Bank in the 1930s remained substantial. Indeed, as shown at Figure 9 and at Table B of the United States Counter-Memorial, United States catch levels in the 1930s were higher than were those in the 1970s.

21. The report of the Fisheries Research Board of Canada, cited in note 55, is offered in support of the proposition that swordfish was an important Canadian fishery. The report does not support, however, the preceding sentence in paragraph 189, which states, without supporting evidence, that Nova Scotia vessels conducted a swordfish fishery on Georges Bank "from the early years of the present century". The earliest date of Canadian fishing for swordfish on Georges Bank mentioned in this report is 1958¹. Frederick William Wallace, editor of the *Canadian Fisherman* magazine, referred to the Canadian swordfish fishery in his article "Thirty Years Progress in Canada's Fish Industry 1914-1944", as follows:

"Swordfishing as a commercial proposition apparently started with New England mackerel fishermen who discovered them chasing the mackerel, and they fitted themselves out with harpoon gear to take them. The business of catching swordfish for food purposes was established by American fishermen as long ago as 1840. The early catches were cut up and salted, but in the course of time a demand arose in New England towns for the fresh steaks and in 1874 a million pounds were thus marketed. In the passage of time, the demand increased and American fishermen could not catch sufficient to supply it.

While swordfish were familiarly known to Nova Scotia fishermen, they were not regarded as a commercial proposition until about 1909, at which time Nova Scotians realized the possibilities of catching and disposing of them in the Boston market. Vessels were fitted out for the pursuit and harpooning of the fish as they came in on the Atlantic coast of the province and the catch taken by local fishermen in 1909 amounted to 146,611 lbs with a marketed value of \$13,695. The fish were dressed and shipped in ice to the Boston dealers²."

¹ S. N. Tibbo, L. R. Day, and W. F. Doucet, *The swordfish (Xiphias Gladius L.). Its life-history and economic importance in the northwest Atlantic*, Fisheries Research Board of Canada, Bulletin No. 130, 1961, p. 11. Cited at Canadian Memorial, para. 189, n. 55, and submitted to the Court by Canada in its deposit of materials on 27 September 1982.

² Wallace, "Thirty Years Progress in Canada's Fishing Industry 1914-1944", *supra* para. 11, n. 12, p. 92. [Emphasis added.]

22. The wreck report cited at note 56, if correct, indicates that one Canadian swordfish vessel was on Georges Bank in 1942. In contrast, the United States Memorial discussed the host of dangers faced by United States fishermen in establishing fisheries on Georges Bank. The table at Annex 19, Volume II, of the United States Memorial, lists 722 men and 87 vessels from just one United States port—Gloucester, Massachusetts—lost between 1837 and 1873 alone. Indeed, 149 Gloucester fishermen were lost on one February night in 1862. Figure facing on page 15.

23. In light of the introduction into evidence by Canada of one wreck report, the United States has begun an examination of records of the United States Customs Service¹. To date, the following information has been compiled concerning United States vessel casualties while en route to Georges Bank, while fishing there, or on the return trip:

Port	Years	Vessel Casualties
Gloucester, Massachusetts	1874-1886	186
Gloucester, Massachusetts	1924-1940	52
Portland, Maine	1913-1941	21
Rockland, Maine	1919-1939	3
New Bedford, Massachusetts	1894-1944	57

C. THE POST-WAR PERIOD

190. In the late 1930s, Canadian fishermen became aware of a potentially lucrative scallop ground on Georges Bank. No significant development of a scallop fishery occurred at that time, however, because of the outbreak of World War II. In 1945, a concerted effort began with the pioneer voyage of the *Mary E. Kenny* under Captain John Beck. By 1947, Canadian scallop draggers were making regular trips to Georges Bank⁵⁷, and during the early 1950s the Bank's scallop grounds became a major engine of growth in the Nova Scotia fishery. At that time, large new draggers, built especially for the offshore scallop fishery, began to enter the fleet. In a few years, Nova Scotia completely dominated the scallop fishery on eastern Georges Bank. By 1966, in the words of a docu-

⁵⁷ Some of the vessels involved were the *Elaine W* from Halifax, the *Nepsya*, *Dale Maxwell* and *Janet and Douglas* from Lunenburg, the *L.G.P.* from the Pubnico area and a number of the larger inshore scallop vessels from the port of Digby. See N. Bourne: *Scallops and the Offshore Fishery of the Maritimes*. Ottawa, Fisheries Research Board of Canada, Bulletin No. 145, 1964, p. 22.

¹ The owner of a vessel in a maritime casualty normally would file a Wreck Report with the United States Customs Service for insurance purposes. Records were maintained at the Customs Ports: Boston, Gloucester, Salem, New Bedford, Provincetown, Marblehead, in Massachusetts; Portsmouth, New Hampshire, and Portland, and Rockland, Maine. The examination of these records is approximately 30 per cent complete.

ment prepared by the New England Fishery Management Council in March 1981, there had been a "virtual abandonment" of eastern Georges Bank by the United States scallop fleet, and "that area had become a traditional Canadian scallop ground"⁵⁸.

⁵⁸ "Environmental Impact Statement Fishery Management Plan Regulatory Analysis North West Atlantic Sea Scallops." Boston, New England Management Council in Consultation with the Mid-Atlantic Management Council and South Atlantic Fishery Management Council, March 1981, pp. A2.2-A2.4.

24. **Comment:** This paragraph should be compared with the discussion of the beginning of the Canadian scallop fishery contained in the document cited in note 57, *Scallops and the Offshore Fishery of the Maritimes*¹. That document indicates that scalloping on Georges Bank was pioneered by the United States, and that Canadian scalloping there prior to 1954 was only "sporadic":

"Canadian fishermen were aware of the presence of sea scallops on several of the offshore banks long before 1945, since they often caught them on line trawl or in otter trawls. Some of these incidental catches of scallops were probably landed and sold with fish catches, although we have no records of this. *Canadian fishermen also knew of the thriving United States offshore scallop fishery which began off Long Island in the early 1920's and spread to Georges Bank in the late 1920's and early 1930's* (Premetz and Snow, 1953). Indeed, in the late 1930's interest was expressed in developing a Canadian offshore fishery and necessary alterations in the fishery regulations were proposed to permit this. However, with the advent of World War II, interest was diverted.

A great deal of the credit for reviving interest and encouraging the development of the Canadian offshore scallop fishery must go the late Mr. T. R. Clouston, of General Sea Foods, Halifax. *He knew of the United States Georges Bank fishery and postulated that some of the Nova Scotian banks had populations of scallops which might support a similar Canadian fishery.* In 1945 he chartered the *M.V. Mary E. Kenney* (under Captain John Beck of Halifax) to explore for scallop beds on Nova Scotia banks, particularly Middle Ground.

Captain Beck was acquainted with offshore scalloping since he had sailed on Georges Bank scallop boats out of the port of New Bedford, Massachusetts. In 1945 he took the *Mary E. Kenney* to

¹ N. Bourne, *Scallops and the Offshore Fishery of the Maritimes*, Fisheries Research Board of Canada, Bulletin No. 145, 1964. Cited at Canadian Memorial, para. 190, n. 57, and submitted to the Court by Canada in its deposit of materials on 27 September 1982.

New Bedford and had her rigged in the same manner as United States offshore scallopers. On his return trip to Halifax, he fished 9 days on Georges Bank and with his crew of 6 men landed 8000 lb of scallop meats in Halifax. *This was the first catch of scallops landed in Canada by an offshore scalloper and it came from Georges Bank*¹."

"In these early days most of the boats which scalloped on the offshore banks had only moderate success. This resulted from several factors. *Georges Bank was unfamiliar to them*. Furthermore, they lacked modern navigational aids and found it difficult to maintain their position in the foggy summer weather on Georges Bank. When good areas were found it was almost impossible to stay on them. Most of the Canadian boats were also underpowered for scallop dragging. *As a result, catches in general were only moderate and the fishery continued in a rather sporadic fashion until 1953*²."

"As mentioned previously, Mr. T. R. Clouston *was convinced the Nova Scotian banks had populations of scallops as extensive as those found on Georges Bank*. Consequently in the initial stages of the fishery the emphasis was to try to scallop on these banks which were already familiar to Canadian fishermen.

"In 1951, one offshore boat fished Port au Port, Newfoundland, where a small commercial fishery has existed since the early 1930's (Squires, 1962). Several boats of the offshore fleet fished this area in 1954 and 1955. In the latter year they landed 342,000 lb of meats from here. Landings dropped to less than 10,000 lb the following year. In 1955 this area was closed to scallop draggers of 65 ft in overall length.

As a result of the 1953 exploratory surveys, an intensive fishery developed on St. Pierre Bank, which continued until 1958. In 1955, 337,000 lb of shucked meats were landed from this bank.

The southern Gulf of St. Lawrence, and in particular Northumberland Strait, was also fished by the offshore fleet. Until 1950, occasional trips were made to this region but in 1955 and

¹ Bourne, p. 21. [Emphasis added.]

² Bourne, p. 22. [Emphasis added.]

1956 a flurry of activity developed here. In the latter year they caught 163,000 lb of meats. In 1956, however, this area was also closed to boats over 65 ft in overall length and since that time no fishing by offshore scallopers has taken place in the Gulf of St. Lawrence.

While the fleet fished these various areas, they continued to make trips to Georges Bank and were gradually becoming acquainted with this area. In 1956, they caught 700,000 lb of meats here in addition to fishing Northumberland Strait, Port au Port, and St. Pierre. It was obvious that these other areas did not have the extensive populations of scallops found on Georges Bank. As populations of scallops were reduced in these other areas the fleet turned more and more to Georges Bank which had had a continuous history of good production. Since 1957 almost the entire effort of the Canadian offshore scallop fleet has been devoted to Georges Bank¹."

25. Thus, the voyage of the *Mary E. Kenney* was not a "pioneer voyage", but rather the "first catch of scallops" by a Canadian vessel in "unfamiliar" territory that was the site of the well-developed "thriving United States offshore fishery" on Georges Bank. Rather than a "pioneer voyage", the Canadian activity was more nearly a tentative incursion into a fishery that had been developed by others, who had borne all the risks of doing so.

26. The beginning of the New England scallop fishery on Georges Bank was described by Edward A. Ackerman of Harvard University, in his work *New England's Fishing Industry*, published in 1941. He states:

The chief source of sea scallops, which produce a meat resembling the bay-scallop eye very closely, is now George's Bank. Boats of much larger size than the small launches used in the bay-scallop fishery put out for sea scallops; hence the landings tend to be concentrated in larger ports. New Bedford, near the grounds of the bay-scallop fishery once centered in Buzzard's Bay, was near enough to men experienced in the industry to be a point of departure for the George's Bank fishery when it was developed in the 1920's.⁶⁷ With some 800,000 pounds being landed yearly, New Bedford is now the chief sea-scallop port in New England. Its position in relation to George's Bank is as favorable as Boston's, and it had the additional advantage of an early start. Boston, however, as the terminus of the Nova

¹ Bourne, p. 25. [Emphasis added.]

Scotia boat line, is also a sea-scallop center of importance. Almost as many sea scallops are shipped annually to Boston from Digby and other Bay of Fundy ports as are landed at New Bedford.

Rockland, Maine, with slightly less than half of New Bedford's landings, is the only other sea-scalloping center. Maine once had an extensive sea-scallop fishery inshore—especially productive in the vicinity of the Penobscot estuary, for which Rockland is the logical port. With the decline of this fishery, it was just as natural for hands experienced in scallop fishing to start from here for George's as from New Bedford. It thus continues as a scalloping port—but it is at a considerable disadvantage in shipping distance compared to New Bedford, and so it cannot hope to expand its present trade greatly. Many more sea scallops are shipped to New York and inland than are used in New England, so that Rockland's disadvantage is more marked than if it had a New England market ¹.

27. This report is evidence that the offshore scallop fishery on Georges Bank was begun in the 1920s by United States fishermen from New Bedford and Boston, Massachusetts, and from Rockland, Maine. As noted (99) at Figure 10 in Part I, Chapter IV, Section 2, of the United States Counter-Memorial, the Canadian scallop fishery on Georges Bank did not take more than five per cent of the scallops from Georges Bank until 1958. As that Section notes, the United States fishing industry at no time abandoned Georges Bank.

191. The growth of the Canadian Georges Bank scallop fishery was accompanied by a diversified interest in other fisheries on the Bank, both old and new. The Bank continued to be a primary location of the Canadian swordfish fishery which expanded and prospered until 1971⁹⁹, when Canada and the United States took regulatory action against swordfish exceeding specified levels of mercury content. Some of the ves-

⁹⁹ J. F. Caddy: *A Review of Some Factors Relevant to Management of Swordfish Fisheries in the Northwest Atlantic*. Technical Report No. 633. St. Andrews, New Brunswick, Department of the Environment, Fisheries and Marine Service, Research and Development Directorate, 1976, pp. 9-10, 21.

¹ E.A. Ackerman, *New England's Fishing Industry*, 1941, p 258. Footnote 67 in the cited text states:

"The presence of sea scallops on George's Bank was known soon after trawling commenced there, but commercial dredging on a large scale was not started until after 1925. In 1924, the first year that sea scallops were listed separately in the United States Bureau of Fisheries Statistics, 138,000 pounds of them were landed in Massachusetts. By 1935 landings had grown to 924,300 pounds in Massachusetts and 743,200 in Maine."

Thus, in 1935, the Maine sea scallop fishery on Georges Bank was nearly as large as that of Massachusetts.

sels which had been employed in that fishery then turned to the development of an offshore lobster fishery focused on the Corsair Canyon area of Georges Bank⁶⁰. During the 1960s, Canadian vessels were active in developing a herring fishery on Georges Bank. This fishery prospered until the early 1970s⁶¹, when overfishing by distant-water fleets led to the virtual extinction of the Georges Bank herring stock. There have also been sporadic landings of mackerel, tuna and squid from the Bank by Canadian fishermen during the post-war period.

⁶⁰ D. G. Wilder and D. E. Graham: *Offshore Lobster Trap Fishing, July 10 to August 10, 1972*, Manuscript Report Series No. 1236. St. Andrews, New Brunswick, Fisheries Research Board of Canada, 1973, p. 2.

⁶¹ R. G. Halliday: "A description of Canadian fisheries in Subarea 5 and Statistical Area 6, 1969-72." (ICNAF, Serial No. 3174, Research Document 74/27, 1974.)

28. **Comment:** There are no "old" Canadian fisheries on Georges Bank. Nothing in the report by J.F. Caddy, cited in note 59, evidences a traditional Canadian swordfish fishery on Georges Bank. It does note that the Canadian longline swordfish industry began in 1962¹. That industry relied principally on areas other than Georges Bank. In 1970, the year before the United States and Canada took action to regulate trade in swordfish that exceeded specified limits of mercury content, Canada took only approximately 24.9 per cent of its east coast swordfish catch from Georges Bank². One interesting aspect of the Caddy report is the author's speculation about the existence of a separate Georges Bank swordfish stock³.

29. The offshore lobster fishery to which some displaced Canadian swordfish fishermen turned in the early 1970s was developed by United States fishermen in the late 1960s. This fact is noted on page 1 of the evidence supplied by Canada, an official document of the Fisheries Research Board of Canada⁴.

¹ J. F. Caddy, *A Review of Some Factors Relevant to Management of Swordfish Fisheries in the Northwest Atlantic*, Technical Report No. 633. St. Andrews, New Brunswick, Dept. of the Environment, Fisheries and Marine Service, Research and Development Directorate, 1976, p. 1. Cited at Canadian Memorial, para. 191, n. 59, and submitted to the Court by Canada in its deposit of materials on 27 September 1982.

² *ICNAF Stat. Bull.*, Vol. 20, 1970, Table 1. Canada took 1,080 metric tons of swordfish in Division 5Ze out of a total swordfish catch of 4,335 metric tons.

³ Caddy, *op. cit.*, pp. 3-4.

⁴ D. G. Wilder and D. E. Graham, *Offshore Lobster Trap Fishing, July 10 to August 10, 1972*, Manuscript Report Series No. 1236, Fisheries Research Board of Canada, 1973, p. 1. Cited at Canadian Memorial, para. 191, n. 60, and submitted to the Court by Canada in its deposit of materials on 27 September 1982.

30. Canada did not enter the herring fishery on Georges Bank until 1967. According to the *ICNAF Statistical Bulletin*, Canada's herring catch exceeded 10,000 metric tons in only three years (1967, 1971, and 1973) before the stock collapsed¹. Canada recognizes that overfishing brought about the "virtual extinction" of the Georges Bank herring stock.

192. Apart from scallops, the most important Canadian fishery on Georges Bank in recent years has been for groundfish. The growing importance of the Bank to the Nova Scotia groundfish industry forms part of a broader development marking a major change in the character of the Canadian Atlantic fishery. Until the 1930s, Nova Scotia fishermen operated extensively in offshore areas, mainly with dory schooners. The inshore fishery, however, was also important, and it was precisely for the promotion and protection of this labour-intensive activity that measures were imposed between the wars to curtail the early expansion of the offshore trawler fleet. Events in the post-war period brought about a revitalization of the offshore fishery, and the growing demand for fish and increased competition for the resources lying off Canada's shores provided the impetus for the development of a modern offshore fleet. Thus an offshore fleet of modern vessels supplanted the dory schooners on which Nova Scotia had traditionally relied. The trend towards the offshore fishery in Atlantic Canada was most pronounced in Nova Scotia: by 1978 the province was home to more than one-half of the Atlantic offshore fleet, which accounted for 80 percent of the total provincial landings.

31. **Comment:** Canada has entered the groundfish fishery on Georges Bank in recent years. In the 20th century, Canada has always had significant catches in Subareas 3 and 4. United States Counter-Memorial. Thus, the impetus for the development of Nova Scotia's groundfish industry did not come from Georges Bank. As shown by Annex 22, the Canadian Georges Bank groundfish catch amounted to less than three percent of Canada's total groundfish catch off its Atlantic Coast in the years 1977 through 1981.

193. The growth of this modern offshore fleet has been reflected in growing Canadian groundfish landings from Georges Bank. Cod and haddock landings rose to record levels in 1966 and significant quantities of pollock, cusk, flounder and redfish were also taken. However, groundfish catch levels on Georges Bank and indeed throughout the Northwest Atlantic decreased after 1966 as a result of the activities of distant-water fleets. This trend has only been reversed with the extension of coastal State jurisdiction to 200 miles in 1977.

¹ See *ICNAF Stat. Bulls.*, 1960-1977.

32. **Comment:** This paragraph is not controversial. It may be recalled, however, that, as shown by Table A of the United States Counter-Memorial, Canadian catches on Georges Bank were comparable to those of third States.

194. The Canadian groundfish fishery on Georges Bank in the post-war period has had two quite distinct components. In addition to the large trawlers, increasing use has been made of the Bank during the summer months by smaller vessels — in particular the “Cape Islanders” — from the ports on the extreme southwestern coast of Nova Scotia most proximate to Georges Bank. This represents the continuation of a local small boat fishery which can be dated from at least as early as the 1920s.

33. **Comment:** No evidence is submitted to support the proposition that a Canadian small-boat fishery on Georges Bank dates from the 1920s. Indeed, the article by Frederick William Wallace, editor of the *Canadian Fisherman*, described in the comment to paragraph 184, would indicate that no such small-boat fishery existed.

D. CANADIAN FISHERIES RESEARCH

195. Canada's participation in the Georges Bank fishery is manifested as well by its strong record of scientific research. Much of this research effort has been concentrated in the field of fisheries biology and to a lesser degree in oceanography, and almost all of it has been sponsored and funded by the Government of Canada to provide a scientific basis for the conservation and management of the living resources of Georges Bank. Research programs have been characterized throughout by spirit of international scientific cooperation, principally between Canadian scientists and those of the United States, but extending as well to their counterparts from other countries whose vessels participated in the fishery in the years before the 200-mile limit. Thus there has been intensive collaboration over the years between Canadian and American scientists at specialized institutions such as the Fisheries Research Board of Canada Biological Station at St. Andrews, New Brunswick, and the Woods Hole Laboratory of the National Marine Fisheries Service in Massachusetts.

34. **Comment:** The nature and level of the scientific research activities of the United States and Canada are discussed at paragraphs 121 through 128 of the United States Memorial and at Chapter V, Annex 3, of this Counter-Memorial, dealing with United States and Canadian activities under ICNAF. As the ICNAF record shows, Canada's scientific research relating to Georges Bank is of recent vintage, is limited to the few species exploited by Canada, and is comparable with the efforts of third States. In comparison to the extensive United States research efforts, however, Canada's research activity is unexceptional.

196. Research vessels owned or chartered by the Government of Canada have made numerous scientific cruises to the Georges Bank area from the 1950s on, complemented by visits of Canadian research workers on board ordinary commercial fishing vessels to observe their operations and to collect technical information. For entirely pragmatic reasons there has been a degree of international specialization in these efforts, with Canada generally taking the lead in research related to the scallops and large pelagic fishes of the Bank (especially swordfish and tuna), and playing an only slightly less decisive role with respect to herring. In the case of haddock, on the other hand, it has been the United States that has carried out most of the work at sea through its major program at Woods Hole, with Canadian scientists providing strong support in the equally important work of analyzing and interpreting the raw data.

35. **Comment:** This paragraph constitutes an admission of the position taken at paragraph 128 of the United States Memorial that the research undertaken by Canada has concerned only the few species exploited by Canada, and has not been directed toward an understanding of the environment of the Georges Bank area as a whole.

Appendix A to Annex 7

EXCERPTS FROM FREDERICK WILLIAM WALLACE, "THIRTY YEARS PROGRESS IN CANADA'S FISH INDUSTRY 1914-1944", IN *CANADIAN FISHERIES MANUAL*, INLAND PRESS LIMITED, MONTREAL, 1945

[Not reproduced]

Annex 8

STATE PRACTICE IN MARITIME DELIMITATION: USE OF THE EQUIDISTANCE METHOD

CHAPTER I

COMMENTS ON THE APPENDIX TO THE CANADIAN MEMORIAL

The Appendix to the Canadian Memorial contains two lists of continental shelf or maritime boundary agreements. These lists are reproduced below, with comments by the United States. There is also a third list, included below, of boundaries in force that were not included in the Appendix to the Canadian Memorial.

SECTION 1. Canada's List Number I: Continental shelf or maritime boundary agreements that incorporate the equidistance method for all or part of the boundary

1. Argentina/Uruguay, 19 November 1973

Comment: For at least 75 per cent of its length, the boundary follows either the thalweg of the Rio de la Plata or the perpendicular to a hypothetical construction line reflecting the general direction of the coast.

Depending upon the intended application of the treaty, the remaining 25 per cent of the boundary may also follow the perpendicular bisector. *See United States Memorial, paragraph 266 and Annex 84, Volume IV.*

2. Australia/Indonesia (Arafura Sea and Pacific Ocean), 18 May 1971

Comment: This agreement establishes parts of three boundaries. First is the boundary in the Arafura Sea between the opposite coasts of Australia and Indonesia, which do not share a land boundary. This boundary was extended by the Agreement of 9 October 1972. *See Canada List II, No. 2.* The extension is not an equidistant line.

Second is the boundary in the Arafura Sea off the southern coast of the Island of New Guinea (Irian). It was completed by the Agreement of 12 February 1973. *See Canada List I, No. 3.*

Third is the boundary in the Pacific Ocean off the northern coast of New Guinea. It was extended by the Agreement of 17 December 1979. *See* Canada List I, No. 26.

Upon its independence, Papua New Guinea succeeded to the boundary agreements with Indonesia.

3. Australia/Indonesia (Arafura Sea), 2 December 1973

Comment: This agreement completed the boundary in the Arafura Sea off the southern coast of West Irian and Papua New Guinea. *See* Canada List I, No. 2.

4. Burma/Thailand, 25 July 1980

Comment: None

5. Colombia/Dominican Republic, 13 January 1978

Comment: The boundary is between opposite coasts of States that do not share a land boundary.

6. Colombia/Haiti, 17 February 1978

Comment: The boundary is between opposite coasts of States that do not share a land boundary. Approximately one-half of the length of the boundary is closer to Jamaica than it is to either Colombia or Haiti.

7. Colombia/Panama (Caribbean Sea and Pacific Ocean), 20 November 1976

Comment: Two boundaries were negotiated. In the Caribbean Sea, over one-half of the 538-nautical-mile boundary is not an equidistant line; segments of parallels of latitude and meridians of longitude, as well as a line along a specific azimuth comprise the majority of the boundary. The boundary in the Pacific Ocean is 447 nautical miles long. Approximately 20 per cent of the boundary follows an equidistant line. Approximately 60 per cent of the boundary follows a parallel of latitude roughly perpendicular to the north-south orientation of the South American coast. *See* United States Memorial, paragraph 265 and Annex 82, Volume IV.

8. Costa Rica/Panama (Caribbean Sea and Pacific Ocean), 2 February 1980

Comment: Two boundaries were negotiated. In the Caribbean Sea, the boundary consists of a 100-nautical-mile segment that is a perpendicular to the general northwest-southeast direction of the coast. The boundary happens to coincide with an equidistant line for about one-third of its length. In the Pacific Ocean, the boundary consists of a 200-nautical-mile segment that also is a perpendicular to the general direction of the coast. If islands are disregarded, it is also equidistant from the mainland coasts of the Parties. *See* United States Memorial, paragraph 266 and Annex 88, Volume IV.

9. Cuba/Mexico, 26 July 1976

Comment: The boundary is between opposite coasts of States that do not share a land boundary.

10. Denmark/Canada, 17 December 1973

Comment: The boundary is between opposite coasts of Canada and Greenland, which do not share a land boundary. Methods other than equidistance were used to delimit over one-third of the 1449-nautical-mile boundary.

11. Denmark/Federal Republic of Germany (North Sea), 9 June 1965

Comment: This agreement delimits only a small portion of the total length of the Denmark-Federal Republic of Germany continental shelf boundary. The remainder of the boundary, which was negotiated following the decision in the *North Sea Continental Shelf* cases, is not an equidistant line. See Canada List II, No. 7.

12. Denmark/Federal Republic of Germany (Baltic Sea), 9 June 1965

Comment: Most of this boundary is between the opposite coasts of the Federal Republic of Germany and the Danish islands of Aerø, Langeland, and Lolland.

13. Denmark/Norway (North Sea), 8 December 1965

Comment: The boundary is between opposite coasts of States that do not share a land boundary.

14. Denmark/Norway (Faeroes), 15 June 1979

Comment: The boundary is between the opposite coasts of Denmark, in respect of the Faroe Islands, and Norway. The States do not share a land boundary.

15. Finland/Union of Soviet Socialist Republics, 20 May 1965

Comment: Most of the boundary is between opposite coasts. Most of the boundary is within 12, and all of it is within 15 nautical miles of the Parties' coasts. The boundary is not equidistant in its entirety; a number of the turning points are closer to the territory of one or the other of the Parties, in one instance by as much as six nautical miles.

16. Finland/Union of Soviet Socialist Republics, extension, 5 May 1967

Comment: The boundary is between opposite coasts. This is an extension of the boundary noted in Number 15, above.

17. Federal Republic of Germany/United Kingdom, 25 November 1971

Comment: This is not an equidistant line between the Parties. On the average, the boundary is approximately 20 nautical miles closer to the

British coastline than it is to that of the Federal Republic of Germany, although it is equidistant between the United Kingdom and the mainland of the continent.

18. France/Australia (Coral Sea and Indian Ocean), 2 October 1980

Comment: Two boundaries were established. The boundary in the Coral Sea is between Australia and New Caledonia, which do not share a land boundary. The boundary in the Indian Ocean is between the opposite coasts of Heard and McDonald Islands (Australia) and Kerguelen Island (France), which do not share a land boundary. The agreement entered into force on 9 January 1983.

19. France/Tonga, 11 January 1980

Comment: The agreement is not known to be in force. The boundary is between the opposite coasts of Tonga and of Wallis and Futuna, which do not share a land boundary.

20. Haiti/Cuba, 27 October 1977

Comment: The boundary is between opposite coasts of States that do not share a land boundary.

21. India/Indonesia, 8 August 1974

Comment: The boundary is between opposite coasts of States that do not share a land boundary. It is a simplified equidistant line.

22. India/Indonesia, extension, 14 January 1977

Comment: The boundary is between opposite coasts of States that do not share a land boundary. This is an extension of the boundary noted in Number 21 above.

23. India/Maldives, 28 December 1976

Comment: The boundary is between opposite coasts of States that do not share a land boundary.

24. India/Sri Lanka (Bay of Bengal and Indian Ocean), 23 March 1976

Comment: The agreement established boundaries in the Bay of Bengal and in the Gulf of Manaar. The boundaries are between opposite coasts of States that do not share a land boundary. Both boundaries are simplified equidistant lines.

25. India/Thailand, 26 June 1978

Comment: The boundary is between the opposite coasts of States that do not share a land boundary. Less than one-half of the boundary is a simplified equidistant line. The remainder of the boundary diverges from an equidistant line; in some places, it is as much as 20 nautical miles closer to one Party than to the other.

26. Indonesia/Papua New Guinea, 17 December 1979

Comment: The boundary is an extension of the boundary in the Pacific Ocean, off the northern coast of New Guinea (Irian), noted in Canada List II, No. 2.

27. Iran/Bahrain, 17 June 1971

Comment: The boundary is between opposite coasts of States that do not share a land boundary. Only part of the boundary is an equidistant line. Approximately one-half of the length of the boundary is closer to Iran than it is to Bahrain.

28. Iran/Oman, 25 July 1974

Comment: The boundary is between opposite coasts of States that do not share a land boundary. Approximately 20 per cent of the boundary is not an equidistant line.

29. Iran/Qatar, 20 September 1969

Comment: The boundary is between opposite coasts of States that do not share a land boundary. Although the agreement does not specify the methodology, it appears that the equidistance method may have been used without giving effect to islands.

30. Iran/United Arab Emirates, 18 August 1974

Comment: The agreement is not known to be in force. The boundary is between opposite coasts of States that do not share a land boundary. This is not an equidistant line, and the agreement does not specify the methodology that was used. It is possible that the equidistance method may have been used, without giving effect to islands.

31. Italy/Greece, 24 May 1977

Comment: The boundary is between opposite coasts of States that do not share a land boundary. The equidistant line was adjusted in a number of places; parts of the boundary are as much as six nautical miles closer to one Party than to the other.

32. Italy/Spain, 19 February 1974

Comment: The boundary is between opposite coasts of States that do not share a land boundary.

33. Italy/Tunisia, 20 August 1971

Comment: The boundary is between opposite coasts of States that do not share a land boundary. In the area of four Italian islands (Lampedusa, Linosa, Lampione, and Pantelleria), the boundary deviates from an equidistant line.

34. Italy/Yugoslavia, 8 January 1968

Comment: The boundary is between opposite coasts. Over 25 per cent of the boundary deviates from an equidistant line by treating islands as special circumstances.

35. Japan/Republic of Korea, 30 January 1974

Comment: The boundary in the Korea Strait is between opposite coasts of States that do not share a land boundary. The Parties did not extend the boundary into the East China Sea; rather, they established a joint development zone there.

36. Malaysia/Indonesia (Malacca Strait and South China Sea, western side), 27 October 1969

Comment: This agreement involves three boundaries. In the Malacca Straits, where the coasts are opposite, the incomplete boundary is an equidistant line. This boundary was later extended without using the equidistance method. *See* Canada List II, No. 10. The second boundary is between the opposite coasts of the Parties in the western side of the South China Sea, off the east coast of West Malaysia. The third boundary, in the eastern side of the South China Sea, begins at the terminus of the Parties' land boundary on the north coast of Borneo. It is not an equidistant line. *See* Canada List II, No. 11.

37. Malaysia/Thailand (Gulf of Thailand), 24 October 1979

Comment: The boundary is a modified equidistant line, giving no effect to an island. It delimits only a part of the continental shelf. Rather than continuing the boundary seaward, the Parties established a joint development area.

38. Mauritius/France, 2 April 1980

Comment: The boundary is between the opposite coasts of Mauritius and Réunion, which do not share a land boundary.

39. Netherlands/Federal Republic of Germany, 1 December 1964

Comment: This agreement delimits only a small portion of the total length of the Federal Republic of Germany-Netherlands boundary. The remainder of the boundary was negotiated following the decision in the *North Sea Continental Shelf* cases. *See* Canada List II, No. 14.

40. Netherlands/United Kingdom, 6 October 1965

Comment: The boundary is between opposite coasts of States that do not share a land boundary. It was amended by the Protocol of 25 November 1971, following the *North Sea Continental Shelf* cases and subsequent boundary negotiations between the Netherlands and the Federal Republic of Germany.

41. Norway/United Kingdom, 10 March 1965

Comment: The boundary is between opposite coasts of States that do not share a land boundary. It is a simplified equidistant line.

42. Norway/United Kingdom, Protocol, 22 December 1978

Comment: The boundary is between opposite coasts of States that do not share a land boundary. This is an extension of the boundary noted in Number 41, above.

43. Poland/German Democratic Republic, 29 October 1968

Comment: None

44. Poland/Union of Soviet Socialist Republics, 29 August 1969

Comment: None

45. St. Lucia/France, 4 March 1981

Comment: The boundary is between opposite coasts of St. Lucia and Martinique, which do not share a land boundary.

46. Saudi Arabia/Iran, 24 October 1968

Comment: The boundary is between opposite coasts of States that do not share a land boundary. This boundary is not equidistant in its entirety. Islands have been treated as special circumstances.

47. Spain/France, 29 January 1974

Comment: This is the boundary in the Bay of Biscay. It deviates substantially from an equidistant line in order to take account of the concavity of the coastline. *See* United States Counter-Memorial, Part III, Chapter III, Section 7, and Annex 10.

48. Sweden/German Democratic Republic, 22 June 1978

Comment: The boundary is between opposite coasts of States that do not share a land boundary. The boundary is a simplified equidistant line.

49. Sweden/Norway, 24 July 1968

Comment: In the area of the continental shelf boundary, the States have opposite coasts. The equidistant line has been simplified. It should be noted that the territorial sea boundary between the Parties, which was the subject of the *Grisbadarna* case, is based upon a perpendicular to the general direction of the coast. *See* United States Memorial, paragraph 241 and note 4 therein.

50. Tokelau/United States of America, 2 December 1980

Comment: The agreement is between the United States and New Zealand. It is not in force. The boundary is between the opposite coasts of

American Samoa and Tokelau, which do not share a land boundary. The boundary is a simplified equidistant line.

51. Trinidad and Tobago/Venezuela, 26 February 1942

Comment: The boundary is between opposite coasts of States that do not share a land boundary. This is not an equidistant line; the boundary represents a negotiated settlement. See State Practice in Maritime Delimitation, Volume I, tab 51, submitted to the Court by Canada in its deposit of materials on 27 September 1982 pursuant to Rule 50(2) of the Rules of Court.

52. Turkey/Union of Soviet Socialist Republics, 23 June 1978

Comment: In most of the area of the continental shelf boundary, the States have opposite coasts.

53. United Kingdom/Denmark, 3 March 1966

Comment: The boundary is between opposite coasts of States that do not share a land boundary. The 1966 agreement was amended by the Agreement of 25 November 1971, following the *North Sea Continental Shelf* cases and subsequent boundary negotiations between Denmark and the Federal Republic of Germany.

54. United States of America/Cook Islands, 11 June 1980

Comment: The agreement is not in force. The boundary is between the opposite coasts of American Samoa and the Cook Islands, which do not share a land boundary.

55. United States of America/Cuba, 16 December 1977

Comment: The agreement is not in force, although the Parties have agreed, pending ratification, to apply the terms of the agreement provisionally. The boundary is between opposite coasts of States that do not share a land boundary. Approximately one-half of the boundary is not an equidistant line.

56. United States of America/Mexico (Caribbean Sea and Pacific Ocean), 5 April 1978

Comment: The agreement is not in force although the Parties have agreed, pending ratification, to apply the terms of the agreement provisionally. It delimits a boundary in the Pacific Ocean and two segments of an incomplete boundary in the Gulf of Mexico. In the central part of the Gulf of Mexico, the coasts are opposite.

57. Venezuela/Dominican Republic, 3 March 1979

Comment: This agreement delimits two boundaries, one to the west and one to the east of the Dominican Republic-Netherlands Antilles

maritime boundary. The eastern boundary is closer to the Dominican Republic than it is to Venezuela, although it is equidistant between the Dominican Republic and the Netherlands Antilles. Both boundaries are between opposite coasts of States that do not share a land boundary.

58. Venezuela/Netherlands (Aves Island/Saba), 30 March 1978

Comment: The boundary is between the opposite coasts of Saba Island and of Aves Island, which do not share a land boundary. The agreement also establishes another boundary off the mainland of Venezuela, which is not an equidistant line. See Canada List II, No. 26.

59. Venezuela/United States of America, 28 March 1978

Comment: The boundary is between the opposite coasts of Puerto Rico and Venezuela, which do not share a land boundary. It is not an equidistant line in its entirety. Approximately one-third of the boundary is closer to the United States (Puerto Rico) than it is to Venezuela, although that portion is equidistant between the United States and the Netherlands Antilles.

SECTION 2. Canada's List Number II: Continental shelf or maritime boundary agreements that do not incorporate the equidistance method.

1. Abu Dhabi/Dubai, 18 February 1968

Comment: This agreement delimits the maritime boundary between two emirates of the United Arab Emirates. The boundary is perpendicular to the general direction of the coast.

2. Australia/Indonesia, 9 October 1972

Comment: The Agreement of 18 May 1971 established a part of the Parties' boundary in the Arafura Sea. See Canada List I, No. 2. The Agreement of 9 October 1972 added to that boundary two segments totaling approximately 515 nautical miles. The course of the boundary was influenced by the then-existing Australian hydrocarbon concessions and the geomorphology of the ocean floor, particularly the Aru and Timor Trenches.

3. Australia/Papua New Guinea, 18 December 1978

Comment: The agreement established separate continental shelf and fishery boundaries, as well as a "Protected Zone" subject to special rules designed to protect the environment and traditional lifestyles. The boundaries are between opposite coasts of States that do not share a land boundary. The agreement is not known to be in force.

4. Chile/Peru, 18 August 1952

Comment: The boundary extends from the land boundary terminus due west along the parallel of latitude, roughly perpendicular to the north-south orientation of the South American coast. See United States Memorial, paragraph 265 and Annex 79, Vol. IV.

5. Colombia/Costa Rica, 17 March 1977

Comment: The boundary is in the Caribbean Sea, between opposite coasts of States that do not share a land boundary. It follows a parallel of latitude, then turns and follows a meridian of longitude. The agreement is not known to be in force.

6. Colombia/Ecuador, 23 August 1975

Comment: The boundary extends from the land boundary terminus due west along the parallel of latitude, roughly perpendicular to the north-south orientation of the South American coast in that area. See United States Memorial, paragraph 265 and Annex 81, Volume IV.

7. Federal Republic of Germany/Denmark, 28 January 1971

Comment: This is an extension of the boundary noted in Canada List I, No. 12. It deviates substantially from the equidistant line in order to take account of the concavity of the coastline. See United States Counter-Memorial, Part III, Chapter III, Section 7.

8. Finland/Sweden, 29 September 1972

Comment: Most of the boundary is between opposite coasts.

9. France/Brazil, 30 January 1981

Comment: The boundary is perpendicular to the general direction of the coasts of Brazil and of French Guiana. The agreement is not known to be in force.

10. Malaysia/Indonesia (Malacca Strait, extension), 21 December 1971

Comment: The boundary is between the opposite coasts of Malaysia and the Indonesian island of Sumatra. It is an extension of the boundary noted in Canada List I, No. 36.

11. Malaysia/Indonesia (South China Sea, eastern side), 27 October 1969

Comment: This is one of three boundaries established by the same agreement. See Canada List I, No. 36. The boundary extends northward from the common land boundary on Borneo.

12. Malaysia/Thailand (Andaman Sea), 21 December 1971

Comment: The boundary at all points is closer to Thailand.

13. Mauritania/Morocco, 14 April 1976

Comment: The boundary extends from the land boundary terminus due west along a parallel of latitude. The agreement is not known to be in force.

14. Netherlands/Federal Republic of Germany, January 1971

Comment: This is an extension of the boundary noted in Canada List I, no. 39. It deviates substantially from the equidistant line in order to take account of the concavity in the coastline. *See* United States Counter-Memorial, Part III, Chapter III, Section 7.

15. Norway/Iceland, 22 October 1981

Comment: The boundary is between the opposite coasts of Iceland and Jan Mayen, which do not share a land boundary. The boundary allows Iceland's exclusive economic zone to extend a full 200 nautical miles.

16. Norway/Union of Soviet Socialist Republics, 29 November 1957

Comment: None.

17. Peru/Ecuador, 18 August 1952

Comment: The boundary extends from the land boundary terminus due west along the parallel of latitude, roughly perpendicular to the north-south orientation of the South American coast in that area. *See* United States Memorial, paragraph 265 and Annex 80, Volume IV.

18. Portugal/Spain (north and south), 12 February 1976

Comment: The agreement delimits two boundaries. Both lines are perpendicular to the general direction of the coast. The northern boundary extends due west along a parallel of latitude. The southern boundary extends due south along a meridian of longitude. The agreement is not known to be in force.

19. Qatar/Abu Dhabi, 20 March 1969

Comment: None.

20. Saudi Arabia/Bahrain, 22 February 1958

Comment: The boundary is between opposite coasts of States that do not share a land boundary. The agreement also establishes an area under Saudi Arabian jurisdiction in which Saudi Arabia agrees to share with Bahrain revenues derived from the exploitation of petroleum resources.

21. Senegal/The Gambia (north and south), 4 June 1975

Comment: Both the northern and southern boundaries follow parallels of latitude due west. *See* United States Memorial, paragraph 266 and Annex 85, Volume IV.

22. Senegal/Guinea Bissau, 26 April 1960

Comment: The boundary is a straight line that divides approximately the convergence of two coastal fronts. *See* United States Memorial, paragraph 266 and Annex 86, Volume IV. The boundary was established by an agreement between France and Portugal.

23. Thailand/Indonesia, 17 December 1971

Comment: The boundary is between opposite coasts of States that do not share a land boundary.

24. Uruguay/Brazil, 11 May 1970

Comment: The boundary is a perpendicular to the general direction of the coast. *See* United States Memorial, paragraph 266 and Annex 83, Volume IV.

25. Venezuela/France, 17 July 1980

Comment: The agreement establishes two separate boundaries, one between the islands of Aves (Venezuela) and Guadeloupe and the other between Aves and Martinique. Both boundaries are on the same meridian of longitude. The agreement entered into force on 28 January 1983.

26. Venezuela/Netherlands (Aruba, Curacao, Bonaire), 30 March 1978

Comment: The boundary is between the opposite coasts of Venezuela and of Aruba, Bonaire, and Curacao, which do not share a land boundary. The boundary deviates significantly from an equidistant line. *See* United States Memorial, Figure 22.

SECTION 3. List Number 3: Boundaries in force not included in the Appendix to the Canadian Memorial**1. Dubai-Sharjah**

Comment: The maritime boundary between the Emirates of Dubai and Sharjah, as well as the land boundary, was submitted to arbitration pursuant to the Agreement of 30 November 1976. The Court of Arbitration used a modified equidistance method, according only a territorial sea enclave to the island of Abu Musa, to determine the maritime boundary.

2. France-United Kingdom

Comment: This boundary was determined by the Court of Arbitration pursuant to the Arbitration Agreement between the French Republic and the United Kingdom. The Court of Arbitration treated the Channel Islands as special circumstances and accorded half-effect to the Scilly Islands. *See* United States Memorial, Figure 23.

3. Kenya-Tanzania

Comment: The boundary was established by agreement on 9 July 1976. Most of the boundary follows a parallel of latitude. See United States Memorial, paragraph 266 and Annex 87, Volume IV.

4. Libya-Tunisia

Comment: The method of delimitation was specified by the Court in the *Tunisia/Libya* case pursuant to the Special Agreement of the Parties. The boundary deviates markedly from the equidistant line. See United States Counter-Memorial, Figure 40.

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5. Sharjah-Umm al Qaywain

Comment: In 1963, the United Kingdom proposed that the maritime boundaries between the Emirates of the Trucial States consist of a series of azimuths, best described as perpendiculars to the general direction of the coast. Some of these boundaries were formally accepted by the Emirates involved, including the Abu Dhabi-Dubai boundary noted in Canada List II, No. 1. The Emirates of Sharjah and Umm al Qaywain also agreed formally to accept the British proposal. Their boundary is the azimuth of 312 degrees, drawn from the land boundary terminus.

6. United States-Union of Soviet Socialist Republics

Comment: The maritime boundary is the boundary established by the 1867 Convention on the Cession of Alaska. See M. Feldman and D. Colson, "The Maritime Boundaries of the United States", in *American Journal of International Law*, Vol. 75, No. 4, 1981, pp. 729, 751-753; cited in the Canadian Memorial at paragraph 361, note 76.

CHAPTER II

CONTINENTAL SHELF AND MARITIME BOUNDARIES

The Appendix to the Canadian Memorial listed continental shelf or maritime boundary agreements, rather than listing boundaries. Agreements and boundaries do not correspond precisely, however, because some boundaries are delimited by more than one agreement. This Chapter lists boundaries rather than agreements. The lists are: (1) boundaries that do not incorporate equidistant lines; (2) boundaries that incorporate only in part equidistant lines; and (3) boundaries that are wholly equidistant lines or simplified equidistant lines. The lists also identify boundaries under agreements in force and boundaries under agreements not in force.

SECTION 1. Continental shelf or maritime boundaries that do not incorporate equidistant lines

A. BOUNDARIES UNDER AGREEMENTS IN FORCE

1. Brazil-Uruguay
2. Chile-Peru
3. Colombia-Ecuador
4. Costa Rica-Panama (Pacific Ocean)
5. Dominican Republic-Venezuela (eastern boundary) ¹
6. Dubai-Abu Dhabi (United Arab Emirates)
7. Ecuador-Peru
8. Federal Republic of Germany-United Kingdom ¹
9. Finland-Sweden
10. France (Guadeloupe)-Venezuela
11. France (Martinique)-Venezuela
12. The Gambia-Senegal (north)
13. The Gambia-Senegal (south)
14. Guinea-Bissau-Senegal
15. Iceland-Norway (Jan Mayen)
16. Indonesia-Malaysia (South China Sea, eastern side)

¹ The boundary is not equidistant between the Parties, but is between one of the Parties and another State or States.

17. Indonesia-Thailand (Andaman Sea)
18. Kenya-Tanzania
19. Libya-Tunisia ¹
20. Malaysia-Thailand (Andaman Sea)
21. Norway-Union of Soviet Socialist Republics
22. Qatar-United Arab Emirates (Abu Dhabi)
23. Sharjah-Umm al Qaywain (United Arab Emirates)
24. Trinidad & Tobago-Venezuela
25. Union of Soviet Socialist Republics-United States of America

B. BOUNDARIES UNDER AGREEMENTS THAT HAVE NOT ENTERED INTO FORCE

1. Australia-Papua New Guinea
2. Brazil-France (French Guiana)
3. Colombia-Costa Rica (Caribbean Sea)
4. Iran-United Arab Emirates (Dubai)
5. Mauritania-Morocco
6. Portugal-Spain (north)
7. Portugal-Spain (south)

SECTION 2. Continental shelf or maritime boundaries that incorporate equidistant lines only in part

A. BOUNDARIES IN FORCE

1. Argentina-Uruguay
2. Australia-Indonesia
3. Bahrain-Iran
4. Bahrain-Saudi Arabia
5. Canada-Denmark
6. Colombia-Panama (Caribbean Sea)
7. Colombia-Panama (Pacific Ocean)
8. Costa Rica-Panama (Caribbean Sea)
9. Denmark-Federal Republic of Germany (North Sea)
10. Dubai-Sharjah (United Arab Emirates) ²
11. Federal Republic of Germany-The Netherlands
12. Finland-Union of Soviet Socialist Republics
13. France-Spain (Bay of Biscay)
14. France-United Kingdom ²

¹ The boundary was not determined by agreement, but by a decision of the International Court of Justice.

² The boundary was not determined by agreement, but by arbitration.

15. Greece-Italy
16. Indonesia-Malaysia (Malacca Strait)
17. India-Thailand
18. Iran-Oman
19. Iran-Qatar
20. Iran-Saudi Arabia
21. Italy-Tunisia
22. Italy-Yugoslavia
23. Japan-Republic of Korea
24. Malaysia-Thailand (Gulf of Thailand)
25. *Netherland Antilles (Aruba, Bonaire, Curaco)-Venezuela*
26. United States of America-Venezuela ¹

B. BOUNDARIES UNDER AGREEMENTS THAT HAVE NOT ENTERED INTO FORCE

1. Cuba-United States of America

SECTION 3. Continental shelf or maritime boundaries that are wholly equidistant lines or simplified equidistant lines

A. BOUNDARIES IN FORCE

1. Australia-France (New Caledonia)
2. Australia (Heard and McDonald Islands)-France (Kerguelen Island)
3. Burma-Thailand
4. Colombia-Dominican Republic
5. Colombia-Haiti
6. Cuba-Haiti
7. Cuba-Mexico
8. Denmark-Federal Republic of Germany (Baltic Sea)
9. Denmark-Norway (North Sea)
10. Denmark (Faroe Islands)-Norway
11. Denmark-United Kingdom
12. Dominican Republic-Venezuela (western boundary)
13. France (Reunion)-Mauritius
14. France (Martinique)-St. Lucia
15. German Democratic Republic-Poland

¹ The boundary in part is not equidistant between the Parties, but between one Party and another State.

16. German Democratic Republic-Sweden
17. India-Indonesia
18. India-Maldives
19. India-Sri Lanka (Bay of Bengal)
20. India-Sri Lanka (Gulf of Manaar)
21. Indonesia-Malaysia (East China Sea, western side)
22. Indonesia-Papua New Guinea (Arafura Sea)
23. Indonesia-Papua New Guinea (Pacific Ocean)
24. Italy-Spain
25. Netherlands-United Kingdom
26. Netherlands Antilles (Saba Island)-Venezuela (Aves Island)
27. Norway-Sweden
28. Norway-United Kingdom
29. Poland-Union of Soviet Socialist Republics
30. Turkey-Union of Soviet Socialist Republics

**B. BOUNDARIES UNDER AGREEMENTS THAT HAVE
NOT ENTERED INTO FORCE**

1. Cook Islands-United States
 2. France (Wallis and Futuna)-Tonga
 3. Mexico-United States of America (Pacific Ocean)
 4. Mexico-United States of America (Gulf of Mexico)
 5. New Zealand (Tokelau)-United States of America
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Annex 9

DELIMITATIONS OF OFFSHORE AREAS BETWEEN STATES WITHIN THE UNITED STATES
UNDER THE COASTAL ENERGY IMPACT PROGRAM

1. The Canadian Memorial seeks to use offshore boundary delimitations between individual states within the United States pursuant to the Coastal Energy Impact Program (CEIP) as evidence that the equidistance method is useful as a means of achieving an equitable delimitation¹. This suggestion is not justified by the facts. Only a minority of the CEIP boundaries are equidistant lines. Most of these boundary delimitations used methods other than equidistance, particularly parallels of latitude and meridians of longitude. Where variations of the equidistance method were used, the CEIP boundaries deviate from the equidistant line whenever necessary to achieve an equitable result.

2. The CEIP provides financial assistance to coastal states of the United States off whose shores continental shelf resources are being developed. The statute provides that the funds are allocated on the basis of "adjacency", and that adjacency is determined on the basis of boundaries drawn seaward from the coastal zone². Thus, the CEIP boundaries do not delimit jurisdiction, but merely serve to allocate funds.

3. A total of 14 CEIP boundaries have been established. Nine of these boundaries were determined by interstate agreement or by the extension of existing territorial sea boundaries. The remaining five boundaries were determined by the Assistant Administrator for Coastal Zone Management of the National Oceanic and Atmospheric Administration of the Department of Commerce, and in accordance with the principles of law applicable to lateral boundary delimitations. In these cases, the states presented written and oral arguments to a panel of expert consultants, and the Assistant Administrator based his decisions upon the panel's report³. These were the five cases discussed by Canada:

"In the five boundaries dealt with to date (New York/Rhode Island, New Jersey/New York, New Jersey/Delaware, Dela-

¹ Canadian Memorial, para. 361, n. 77.

² 16 U.S.C. sec. 1456a(b)(4)(B).

³ J. I. Charney, "The Delimitation of Lateral Seaward Boundaries Between States in a Domestic Context", *American Journal of International Law*, Vol. 75, No.1, 1981, pp. 28, 30. Cited in the Canadian Memorial, para. 361, n. 7.

ware/Maryland, and Mississippi/Louisiana), considerable prominence has been given to the method of equidistance either by means of a strict equidistance line or an equidistance line modified to take account of the special circumstances¹.

4. These five CEIP boundaries are not evidence that the equidistance method is generally equitable. On the contrary, in three of the five cases mentioned by Canada (New Jersey-Delaware, Delaware-Maryland, and Mississippi-Louisiana), it was determined that a concavity in the coastline constituted a special circumstance that rendered an equidistant line inequitable. These determinations were strongly influenced by the *North Sea Continental Shelf* cases, the *Anglo-French Arbitration*, and the use of proportionality as a test of the equitableness of the proposed solutions. These areas are similar to the Gulf of Maine area, in that the concavity of the coastline would cause an equidistant line to cut off individual states from their adjacent offshore areas. Ultimately, the boundaries were drawn through the use of a "half-effects" method. Two lines were drawn in each case, an equidistant line and a line that was "extremely favorable to the state that was adversely affected by the special circumstances and other relevant facts"². The boundary as adopted bisected the two lines. As a result, each of these boundaries departs significantly from strict equidistance. The three boundaries are depicted at Figures 1 and 2³.

5. The equidistance method has been used in the delimitation of only one of the nine CEIP boundaries determined by interstate agreements or by the extension of existing territorial sea boundaries, none of which was discussed in the Canadian Memorial. Five of the boundaries were drawn due east or due west along parallels of latitude (California-Oregon⁴, Oregon-Washington⁵, Florida-Georgia⁶, North Carolina-Virginia⁷, and

¹ Canadian Memorial, para. 361, n. 77.

² Charney, *op. cit.*, p. 64.

³ Louisiana and Mississippi subsequently agreed in judicial proceedings not to use a CEIP boundary, but instead to divide the CEIP funds for the areas off their coast in a ratio of 70:30. *State of Mississippi v. Secretary of Commerce*, Stipulation of Settlement, 26 February 1982.

⁴ The California-Oregon CEIP boundary is an extension of the state boundary through the territorial sea. 35th Cong., Sess. II, ch. 33, 11 Stat. 383 (1859).

⁵ The Oregon-Washington CEIP boundary is an extension of the state boundary through the territorial sea. The territorial sea boundary was established by an interstate compact approved by Congress. Pub. L. No. 85-575, 72 Stat. 455 (1958).

⁶ The Florida-Georgia seaward boundary for all purposes was established by an interstate compact approved by Congress. Pub. L. No. 91-498, 84 Stat. 1094 (1970).

⁷ The North Carolina-Virginia seaward boundary for all purposes was established by an interstate compact approved by Congress. Pub. L. No. 92-588, 86 Stat. 1298 (1972).

Virginia-Maryland ¹), and two were drawn due south along meridians of longitude (Mississippi-Alabama ², and Alabama-Florida ³). One other CEIP boundary was drawn as the extension of the land boundary (South Carolina-North Carolina ⁴). Only the Texas-Louisiana boundary ⁵ uses the equidistance method.

6. Thus, the CEIP boundaries do not suggest that the equidistance method is generally equitable. On the contrary, they demonstrate that other methods often have been used, or that the equidistance method has been modified, to achieve equitable results.

¹ The Virginia-Maryland CEIP boundary is an extension of the last segment of the state boundary through the territorial sea. The territorial sea boundary was established by an interstate compact approved by Congress. Pub. L. No. 92-565, 86 Stat. 1179 (1972).

² The Mississippi-Alabama CEIP boundary was established by an agreement between the states.

³ The Alabama-Florida CEIP boundary is an extension of the state boundary through the territorial sea. The territorial sea boundary was established by an interstate compact approved by Congress. Pub. L. No. 83-351, 68 Stat. 77 (1954).

⁴ The North Carolina-South Carolina seaward boundary for all purposes was established by an interstate compact approved by Congress. Pub. L. No. 97-59, 95 Stat. 988 (1981).

⁵ The Texas-Louisiana CEIP boundary is an extension of the state boundary through the territorial sea. The territorial sea boundary was determined by litigation to be a median line. *State of Texas v. State of Louisiana*, 426 U.S. 465 (1975).

Annex 10

THE DELIMITATION OF THE CONTINENTAL SHELF BOUNDARY IN THE BAY OF BISCAY

1. France and Spain used a combination of methods to delimit their continental shelf boundary in the Bay of Biscay¹. This Annex analyzes the methods of delimitation by examining in turn the simplified coastlines used by the Parties and the locations of Points Q, R, and T on the agreed boundary. Figure 1.

2. For purposes of the delimitation, France and Spain developed simplified coastlines to represent their respective coastal lengths². The simplified Spanish coastline connects the terminus of the land boundary (Point M) with Cabo Ortegal. The simplified French coastline has two segments: from the terminus of the land boundary to Pointe de la Negade and from Pointe de la Negade to Pointe du Raz.

3. Point Q is the endpoint of the boundary through the territorial seas and contiguous zones. From Points Q to Q₁₃, the line was drawn according to the equidistance method, using the actual, and not the simplified, coastlines.

4. Point R was derived from the simplified coastlines. Pointe de la Negade, the juncture of the two segments of the simplified French coastline, is roughly the point at which the French coast changes direction. Point X on the simplified Spanish coastline is the same distance from the land boundary terminus as is Pointe de la Negade, i.e., 129 nautical miles (239 kilometers). Point R is the midpoint between (a) the intersection (Point Q₁₁) of the equidistant line and a straight line from Point X to Pointe de la Negade, and (b) the point (Point P) on the equidistant line that is the same distance from the land boundary terminus as are

¹ In addition to delimiting the continental shelf boundary, France and Spain established a "joint development zone" to deal with deposits within the zone that lie across the boundary and that are exploitable from both sides. See Convention Between the Government of the French Republic and the Government of the Spanish State on the Delimitation of the Continental Shelves of the Two States in the Bay of Biscay, 29 January 1974, Articles II-IV and Annex II. The joint development zone is illustrated in *Limits in the Seas*, No. 83, United States Memorial, Annex 78, Vol. IV.

² See *Limits in the Seas*, No. 83, *supra*, p. 5.

Point X and Pointe de la Negade, i.e., 129 nautical miles. Point R is also equidistant from the actual coastlines of France and Spain. In this manner, the Parties related the location of Point R, and thus the extent of the equidistant segment of the boundary, to the change in direction of the coast¹.

5. The boundary between Point R and Point T apparently was based on a proportionality calculation involving the remaining lengths of the simplified coastlines, i.e., from Point X to Cabo Ortegal and from Pointe de la Negade to Pointe du Raz. The simplified Spanish coastline from Point X to Cabo Ortegal is 138.3 nautical miles (256.1 kilometers) in length. The simplified French coastline from Pointe de la Negade to Pointe du Raz is 213.2 nautical miles (394.8 kilometers) in length. The ratio of these lengths is 1:1.54.

6. Point T divides the closing line between Cabo Ortegal and Pointe du Raz in almost precisely the same ratio. Point T is 114.9 nautical miles (212.8 kilometers) from Cabo Ortegal, and 173.6 nautical miles (321.5 kilometers) from Pointe du Raz. The ratio of these figures is 1:1.51.

7. The location of Point T on the closing line is also such that the boundary from Point R to Point T divides the remaining area (the area enclosed by lines connecting Cabo Ortegal to Pointe du Raz to Pointe de la Negade to Point R to Point X to Cabo Ortegal) in approximately the same proportion as those represented by these other ratios. The line allocates 13,561 square nautical miles (46,514 square kilometers) of this area to Spain and 22,109 square nautical miles (75,834 square kilometers) to France, for a ratio of 1:1.63².

8. The course of the boundary from Point R to Point T may be related not only to the proportionality calculations, but also to the geomorphology of the area³. At Point T on the closing line, the boundary is roughly the same distance from the 100-fathom-depth contours off the respective coasts of the Parties. Figure 2.

¹ A line from Point X to Point R to Pointe de la Negade encloses an area of approximately 9,657 square nautical miles. The boundary allocates 5,303 square nautical miles of this area to Spain and 4,354 square nautical miles of this area to France.

² These calculations exclude the areas landward of the simplified coastlines. Note that the use of the simplified coastlines for purposes of proportionality could have been disadvantageous to France, whose coastline was comparatively larger when measured along the sinuosities (a ratio of 1:1.59). The use of the simplified coastlines was balanced, however, by the exclusion of the areas landward of these lines, because more of the continental shelf of France than that of Spain was excluded from the proportionality calculation.

³ See J. L. de Azcárraga, *Revista española de derecho internacional*, Vol. XXVIII, pp. 131-138. Reprinted at Appendix A.

9. The delimitation in the Bay of Biscay illustrates the principle that any method or combination of methods may be used that produce an equitable solution¹. The choice of the specific techniques used in the Bay of Biscay delimitation depends to a great extent upon such incidental factors as the distance of the point of change in the direction of the coast (Pointe de la Negade) from the land boundary terminus, the extent to which the simplified coastlines conform to the actual coast, and the extent of the areas excluded from the proportionality calculation by the use of simplified coastlines. Therefore, although the combination of methods produced an equitable result in the Bay of Biscay, the precise techniques used in the Bay of Biscay are not necessarily transferable to the Gulf of Maine area, or to other boundary areas where the coastline configurations are not identical to those of the Bay of Biscay. Of greater significance is the result of the delimitation. The Parties presumably adopted the specific methods and techniques that were used because the Parties regarded the result as equitable in those geographic circumstances. Thus, the result of the Bay of Biscay delimitation yields insight into the nature of an equitable result in the similar circumstances of the Gulf of Maine area.

¹ See United States Memorial, para. 262.

Appendix A to Annex 10

J. L. DE AZCÁRRAGA, "ESPAÑA SUSCRIBE, CON FRANCIA E ITALIA, DOS CONVENIOS SOBRE DELIMITACION DE SUS PLATAFORMAS SUBMARINAS COMUNES", *REVISTA ESPAÑOLA DE DERECHO INTERNACIONAL*, VOL. XXVIII, PP. 131-138
(PLUS TRANSLATION)

[Not reproduced]

Volume V
DOCUMENTARY ANNEXES

Annex 11

INTERNATIONAL HYDROGRAPHIC ORGANIZATION, *LIMITS OF OCEANS AND SEAS*,
SPECIAL PUBLICATION NO. 28, 3RD EDITION, 1953, P. 14, AND PORTION OF CHART
INSERT

24.—Gulf of St. Lawrence.*On the Northeast.*

A line running from Cape Bauld (North point of Kirpon Island, 51°40' N, 55°25' W) to the East extreme of Belle Isle and on to the Northeast Ledge (52°02' N, 55°15' W). Thence a line joining this ledge with the East extreme of Cape St. Charles (52°13' N) in Labrador.

On the Southeast.

A line from Cape Canso (45°20' N, 61° W) to Red Point (45°35' N, 60°45' W) in Cape Breton Island, through this Island to Cape Breton and on to Pointe Blanche (46°45' N, 56°11' W) in the Island of St. Pierre, and thence to the Southwest point of Morgan Island (46°51' N, 55°49' W).

On the West.

The meridian of 64°30' W, but the whole of Anticosti Island is included in the Gulf.

25.—Bay of Fundy.*On the Southwest.*

A line running northwesterly from Cape St. Mary (44°05' N) Nova Scotia, through Machias Seal Island (67°06' W) and on to Little River Head (44°39' N) in the State of Maine.

26.—Gulf of Mexico.*On the Southeast.*

A line joining Cape Catoche Light (21°37' N, 87°04' W) with the Light on Cape San Antonio in Cuba, through this island to the meridian of 83° W and to the Northward along this meridian to the latitude of the South point of the Dry Tortugas (24°35' N), along this parallel Eastward to Rebecca Shoal (82°35' W) thence through the shoals and Florida Keys to the mainland at eastern end of Florida Bay, all the narrow waters between the Dry Tortugas and the mainland being considered to be within the Gulf.

27.—Caribbean Sea.*In the Yucatan Channel.*

The same limit as that described for the Gulf of Mexico (26).

On the North.

In the Windward Channel.

A line joining Caleta Point (74°15' W) and Pearl Point (19°40' N) in Haïti.

In the Mona Passage.

A line joining Cape Engano and the extreme of Agujereada (18°31' N, 67°08' W) in Puerto Rico.

Annex 12

- (144) FIGURE: 144 DEGREES – TRUE PERPENDICULAR TO THE GENERAL DIRECTION OF THE COAST; 157 DEGREES – TRUE PERPENDICULAR TO THE CANADIAN 67 DEGREE “TREND LINE”

Annex 13

- (145) FIGURE: ONE TEST OF THE GENERAL DIRECTION OF THE COAST IN THE GULF OF MAINE AREA (54 DEGREES)

Annex 14

INTERNATIONAL BOUNDARY COMMISSION, UNITED STATES-CANADA, SPECIAL REPORT NO. 1, 1956, PP. 10-14

[Not reproduced]

Annex 15

LETTER FROM SANTIAGO TORRES BERNÁRDEZ, REGISTRAR, INTERNATIONAL COURT OF JUSTICE, TO MR. DAVIS R. ROBINSON, AGENT OF THE UNITED STATES OF AMERICA BEFORE THE INTERNATIONAL COURT OF JUSTICE, DATED 21 DECEMBER 1982, WITH ATTACHMENT

[Letter not reproduced; for attachment see VII, Correspondence, No. 48]

LETTER FROM MR. DAVIS R. ROBINSON, AGENT OF THE UNITED STATES OF AMERICA BEFORE THE INTERNATIONAL COURT OF JUSTICE, TO MR. SANTIAGO TORRES BERNÁRDEZ, REGISTRAR, INTERNATIONAL COURT OF JUSTICE, DATED 20 JANUARY 1983, WITH ATTACHMENT (COPIES OF ATTACHED GEOPHYSICAL PERMITS OMITTED)

[See VII, Correspondence, No. 49]

Annex 16

ICNAF, SECOND ANNUAL REPORT, 1951-1952, PART 4

[Not reproduced]

Annex 17

UNITED STATES-CANADA NON-SCALLOP LANDINGS FROM GEORGES BANK,
1904-1981

[Not reproduced]

Annex 18

UNITED STATES-CANADA GROUND FISH CATCHES FROM THE NORTHEASTERN
PORTION OF GEORGES BANK, 1969-1978

[Not reproduced]

Annex 19

J. F. CADDY AND E. I. LORD, "HIGH PRICE OF SCALLOP LANDINGS CONCEALS
DECLINE IN OFFSHORE STOCKS", *FISHERIES OF CANADA*, VOL. 23, NO. 5,
MAY-JUNE 1971, PP. 3-7

J. F. CADDY, "SOME RECOMMENDATIONS FOR CONSERVATION OF GEORGES BANK
SCALLOP STOCKS", ICNAF RES. DOC. 72/6, SERIAL NO. 2689 (B.G. 7),
ANNUAL MEETING - JUNE 1972

[Not reproduced]

Annex 20

UNITED STATES-CANADA GEORGES BANK SCALLOP CATCHES, 1940-1981

[Not reproduced]

Annex 21

G. B. GOODE, *THE FISHERIES AND FISHERY INDUSTRIES OF THE UNITED STATES*,
WASHINGTON, D.C., GOVERNMENT PRINTING OFFICE, 1887, SECTION III, PP. 74-75,
WITH MAP

[Not reproduced]

Annex 22

(146) COMPARISON OF CANADIAN CATCH FOR THE NORTHEASTERN PORTION OF GEORGES
BANK WITH TOTAL CANADIAN CATCH IN THE NORTHWEST ATLANTIC FOR THE
YEARS 1977-1981

Annex 23

G. B. GOODE, *THE FISHERIES AND FISHERY INDUSTRIES OF THE UNITED STATES*,
WASHINGTON, D.C., GOVERNMENT PRINTING OFFICE, 1887, SECTION V, 1887, P. 38

[Not reproduced]

Annex 24

R. MCFARLAND, *A HISTORY OF NEW ENGLAND FISHERIES*, NEW YORK,
UNIVERSITY OF PENNSYLVANIA PRESS, BY D. APPLETON AND CO., AGENTS, 1911,
PP. 144-145, 272-273

[Not reproduced]

Annex 25

FISHING VESSELS DOCUMENTED UNDER THE LAWS OF THE UNITED STATES
OPERATING OUT OF MAINE AND NEW HAMPSHIRE PORTS AND FISHING ON GEORGES
BANK OR IN THE "UNCLAIMED AREA"

Vessel Name	Port of Operation	Length (o.a.) in ft.
1 <i>Adam's Rib</i>	Owl's Head, Maine	60
2 <i>Allyson & Theresa</i>	Portland, Maine	72
3 <i>Amy Michele</i>	Portsmouth, N.H.	65
4 <i>Amy W.</i>	Boothbay Harbor, Maine	68
5 <i>Anna Lena</i>	Port Clyde, Maine	68
6 <i>April Gale</i>	West Point & Portland, Maine	76
7 <i>Araho</i>	Rockland, Maine	120
8 <i>Atlantic Harvester</i>	New Harbor & Rockland, Maine	105
9 <i>Atlantic Mariner</i>	New Harbor & Rockland, Maine	90
10 <i>Aviator</i>	Portland, Maine	60
11 <i>Bad Penny</i>	Boothbay, Maine	54
12 <i>Big Dipper</i>	Portland, Maine	72
13 <i>Blue Water III</i>	Stonington, Maine	56
14 <i>Calvin L. Stinson</i>	Rockland, Maine	135
15 <i>Captain Bligh</i>	Portland, Maine	75
16 <i>Celian B. Putnam</i>	Portland, Maine	147
17 <i>Charlene</i>	Brooklin, Maine	50
18 <i>Creole Belle</i>	Portland, Maine	70
19 <i>Curlew</i>	Portland, Maine,	95
20 <i>Cynthia</i>	Boothbay Harbor, Maine	52
21 <i>Dona Marie</i>	Portland, Maine	85
22 <i>Donna Marie</i>	Jonesport, Maine	42
23 <i>Ella & Josie</i>	Portland, Maine	74
24 <i>Explorer</i>	Portsmouth, N.H.	94
25 <i>Explorer</i>	Portland, Maine	96
26 <i>Francis J. O'Hara</i>	Rockland, Maine	110
27 <i>Freedom</i>	Rockland, Maine	120
28 <i>Golden Dawn</i>	Cundy's Harbor, Maine	68
29 <i>Grande Duchess</i>	Portland, Maine	108
30 <i>Gulf King IV</i>	Portland, Maine	75
31 <i>Hannah & Ryan</i>	Rockland, Maine	86
32 <i>High Chaparral</i>	New Harbor, Maine	87
33 <i>Highland Pride</i>	Port Clyde, Maine	68
34 <i>Independence</i>	Stonington, Maine	50
35 <i>Irene Alton</i>	Owl's Head, Maine	57
36 <i>Irene's Way</i>	Boothbay Harbor, Maine	81

37 <i>J. Bradley O'Hara</i>	Rockland, Maine	120
38 <i>Jack & Andy</i>	Portland, Maine	45
39 <i>Jamie Marie</i>	Matinicus Is. & Spruce Head, Maine	64
40 <i>Jessica & Lisa</i>	Portland, Maine	90
41 <i>Jesse</i>	Milbridge, Maine	57
42 <i>John David</i>	Orrs Island, Maine	55
43 <i>John Neptune</i>	Boothbay Harbor, Maine	75
44 <i>Kathleen & Julie II</i>	Portland, Maine	95
45 <i>Katherine Marie</i>	Portland, Maine	75
46 <i>Kegan David Drew</i>	Portland, Maine	73
47 <i>Lady Clare</i>	Portsmouth, N.H.	73
48 <i>Lorraine II</i>	Brooklin, Maine	50
49 <i>Margaret F.</i>	Cundy's Harbor, Maine	58
50 <i>Martha Ingraham</i>	Portland, Maine	55
51 <i>Mary A. Kelly</i>	Portland, Maine	65
52 <i>Mary Ann Bradford I</i>	Portland, Maine	55
53 <i>Mary Ellen</i>	Cuddy's Harbor, Maine	68
54 <i>Massachusetts</i>	Rockland, Maine	115
55 <i>Michelle Jean II</i>	Portsmouth, N.H.	50
56 <i>Ms. Ellen</i>	Portland, Maine	65
57 <i>Miss Emily</i>	Southwest Harbor, Maine	60
58 <i>Miss Kirsty</i>	Port Clyde, Maine	50
59 <i>Miss Quality</i>	Portland, Maine	85
60 <i>Miss Vicki</i>	Rockland, Maine	83
61 <i>My Marie</i>	Sebasco Estates, Maine	85
62 <i>Narragansett</i>	Rockland, Maine	75
63 <i>Northern Hommijer</i>	Tenant's Harbor, Maine	55
64 <i>Northern Minor</i>	Southwest Harbor, Maine	63
65 <i>Patricia Lee</i>	Tenant's Harbor, Maine	60
66 <i>Parul</i>	Portsmouth, N.H.	55
67 <i>Pioneer</i>	Portland, Maine	75
68 <i>Pocahontas</i>	Rockland, Maine	91
69 <i>Powhatan</i>	Harpswell & Portland, Maine	93
70 <i>Princess</i>	Harpswell & Portland, Maine	65
71 <i>Rattler</i>	Portland, Maine	90
72 <i>Ranger</i>	Rockland, Maine	120
73 <i>Resolute</i>	Portland, Maine	90
74 <i>Rush</i>	Rockland, Maine	80
75 <i>Sally & Katherine</i>	Portsmouth, N.H.	65
76 <i>Scotsman</i>	Portsmouth, N.H.	54
77 <i>Sea Bring</i>	Boothbay Harbor, Maine	76
78 <i>Sea Flea II</i>	Stonington, Maine	55
79 <i>Sea Leion IV</i>	Portland, Maine	74
80 <i>Sea Trek</i>	Portland, Maine	95
81 <i>Shellmac</i>	Rockland, Maine	105
82 <i>Shirley G.</i>	Jonesport, Maine	40
83 <i>Silver Lining</i>	Portland, Maine	65
84 <i>Sirius</i>	Port Clyde, Maine	50
85 <i>Stacie Vea</i>	Portsmouth, N.H. & Stonington, Maine	55

86	<i>Starligh (June-Delight)</i>	Portsmouth, N.H.	52
87	<i>Surge</i>	Portland, Maine	137
88	<i>Tara Lynn</i>	Portland, Maine	54
89	<i>Teddy & Mary</i>	Portland, Maine & Gloucester, Mass.	78
90	<i>Teresa Marie</i>	Portland, Maine	80
91	<i>Teresa Marie II</i>	Portland, Maine	93
92	<i>Tori T.</i>	Rockland, Maine	76
93	<i>Tripolina</i>	Portland, Maine	55
94	<i>Virginia Dare</i>	Portland, Maine	85
95	<i>Walter Alden Leeman</i>	Harpswell, Maine	76
96	<i>Western Sea</i>	Rockland, Maine	86
97	<i>Yankee</i>	York Harbor, Maine	56
98	<i>Dawn Ellen</i>	Bucks Harbor, Maine	38

Annex 26

**PERMITS FOR EXPLORATORY WORK INCLUDING THE NORTHEAST PORTION OF
GEORGES BANK: UPDATE TO ANNEX 40 TO THE UNITED STATES MEMORIAL**

**PERMITS FOR EXPLORATORY WORK INCLUDING NORTHEAST
PORTION OF GEORGES BANK**

Permit #	Date Approved	Company	Permit Area	Work Commenced	Work Completed	Remarks	Approximate Number of Line Miles in Northeast Portion of Georges Bank
E3-67	06-29-67	Chevron	North, Mid-Atlantic	07-03-67	10-16-67	Seismic	325
E2-68	04-23-68	(Group Survey) Exploration Surveys, Inc.	North, Mid-Atlantic	07-02-68	12-04-68	Seismic (Vibroscis) Seismic (Sparker) Gravity Magnetics	570 570 160
E3-68B	06-05-68	Shell (by Shell)	North, South, Mid-Atlantic	06-12-68	09-06-68	Seismic (Sparker)	78
E4-69	07-16-69	Exploration Surveys, Inc.	North, Mid-Atlantic	08-19-69	10-19-69	Gravity Magnetics	78
E1-70	03-30-70	Digicon(Group Survey)	North Atlantic	04-25-70	09-25-70	Seismic (Air Gun)	1130
E1-71	05-13-71	Digicon (Group Shoot)	North, Mid-Atlantic	06-26-71	10-13-71	Seismic (Air Gun)	737
E2-72	05-04-72	Digicon (Group Survey)	Georges Bank	05-22-72	07-08-72	Seismic (Air Gun)	2075
E1-74	02-13-74	Digicon (for Getty)	North, South, Mid-Atlantic	02-20-74	12-07-74	Seismic (Air Gun)	2600
E3-75	05-15-75	Digicon (Group Survey)	North, Mid-Atlantic	05-17-75	11-17-75	Seismic (Air Gun)	4400
E6-75	06-03-75	Mobil (for Mobil)	North, South, Mid-Atlantic	06-19-75	09-01-76	Seismic (Air Gun)	1700
E8-75	07-10-75	GSI (Group Survey)	Georges Bank	08-12-75	12-03-75	Seismic (Air Gun)	1425
E21-75	10-30-75 eff 09-29-75	Digicon (for USGS)	North, Mid-Atlantic	10-02-75	11-20-75	Seismic (Air Gun)	364
E13-76	04-29-76	Texaco (by Texaco)	Georges Bank	05-21-76	07-19-76	Air Gun	600
E22-76	07-13-76	Chevron (by Digicon)	North, Mid-Atlantic	07-23-76	09-06-76	Seismic (Air Gun, Sparker)	150
E25-76	09-03-76	Digicon (for Petty-Ray)	North Atlantic	09-09-76	11-22-76	Seismic (Air Gun)	1400
E32-76	09-28-79 retroactive to 10-28-76	Exxon (by Esso)	Georges Bank	11-08-76	11-15-76	Seismic Gravity Magnetics	40 40 40
E8-77	08-10-77	Digicon (by Gulf)	Georges Bank	08-11-77	08-14-77	Seismic (Air Gun)	92
E9-77	08-17-77	Digicon (for Mobil)	Georges Bank	08-15-77	08-26-77	Seismic (Air Gun)	77
E4-78	05-05-78 physical	USGS (by Geo-Atlantic Service, Inc.	North, Mid-Atlantic	05-24-78	11-05-78	CDP Seismic	300
E12-78	10-11-78	Geophysical Service, Inc. (for GSI)	North Atlantic	10-30-78	11-08-78	CDP Seismic	386
E17-78	12-12-78	USGS (by Prakla-Seimos)	North Atlantic	08-11-79	09-04-79	CDP Seismic Gravity Magnetics	46 46 46
E2-79	04-13-79	Exxon (by Teledyne)	North, Mid-Atlantic	06-01-79	07-27-79	CDP Seismic	27
E1-81	02-20-81	Exxon (by Petty-Ray)	North, South, Mid-Atlantic	03-15-81	12-31-81	CDP Seismic	503
E10-82	05-17-82	GECO(U.S.), Inc.	North, South, Mid-Atlantic	05-17-82	07-15-82	Seismic Gravity	400 400
E3-83	05-03-83	Western Geophysical	North Atlantic	05-15-83	ongoing	Seismic Gravity Magnetics	

Annex 27

- (147) **FIGURE: AREA SUBJECT TO CALL FOR NOMINATIONS IN UNITED STATES OUTER CONTINENTAL SHELF LEASE SALE NUMBER 42, 17 JUNE 1975, WITH THE BOUNDARY PROPOSED BY THE UNITED STATES AND THE CANADIAN LINE**
- (148) **FIGURE: UNITED STATES LAW ENFORCEMENT LINE TO PROTECT THE LOBSTER OF THE UNITED STATES CONTINENTAL SHELF WITH THE BOUNDARY PROPOSED BY THE UNITED STATES AND THE CANADIAN LINE**
-

Annex 28

PROCLAMATION BY THE PRESIDENT OF THE UNITED STATES ESTABLISHING THE EXCLUSIVE ECONOMIC ZONE, 10 MARCH 1983

STATEMENT BY THE PRESIDENT OF THE UNITED STATES REGARDING THE PROCLAMATION OF THE EXCLUSIVE ECONOMIC ZONE, 10 MARCH 1983

STATEMENT BY THE PRESIDENT OF THE UNITED STATES REGARDING THE THIRD UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA, 9 JULY 1982

[Not reproduced]

Annex 29

F. W. BELL, "THE POPE AND THE PRICE OF FISH", *THE AMERICAN ECONOMIC REVIEW*, VOL. VIII, NO. 5, PART 1, DECEMBER 1968, PP. 1346-1350

[Not reproduced]

Annex 30

THE FEDERAL RULES OF EVIDENCE, RULE 408, 28 U.S.C., APPENDIX
(1976 EDITION), PP. 553-554

[Not reproduced]

Annex 31

H. J. GLASBEEK, *EVIDENCE: CASES AND MATERIALS*, BUTTERWORTHS, TORONTO,
PP. 299-301

[Not reproduced]

Annex 32

E. LUARD (ED.), *THE INTERNATIONAL REGULATION OF FRONTIER DISPUTES*,
THAMES AND THURSTON, LONDON, 1970, PP. 185-187

[Not reproduced]

Annex 33

G. SPERDUTI, "PRESCRIZIONE, CONSUETUDINE E ACQUIESCENZA IN DIRITTO
INTERNAZIONALE", *RIVISTA DI DIRITTO INTERNAZIONALE*, VOL. XLIV, 1961,
PP. 3-15 (PLUS TRANSLATION)

[Not reproduced]

Annex 34

**NOTE FROM THE DEPARTMENT OF STATE TO THE EMBASSY OF CANADA,
DATED 29 NOVEMBER 1966**

**NOTE VERBALE FROM THE DEPARTMENT OF EXTERNAL AFFAIRS TO THE EMBASSY OF
THE UNITED STATES, DATED 11 OCTOBER 1967, AND DELIVERED 25 OCTOBER 1967**

**NOTE FROM THE DEPARTMENT OF STATE TO THE EMBASSY OF CANADA,
DATED 1 NOVEMBER 1967**

**AIDE-MÉMOIRE FROM THE EMBASSY OF CANADA TO THE DEPARTMENT OF STATE,
DATED 11 NOVEMBER 1967**

**NOTE FROM THE DEPARTMENT OF STATE TO THE EMBASSY OF CANADA,
DATED 29 NOVEMBER 1966**

Department of State
Washington

The Secretary of State presents his compliments to His Excellency the Ambassador of Canada and has the honor to enclose for the information of his Government a copy of Public Law 89-658, an Act to establish a contiguous fishery zone beyond the territorial sea of the United States. The Act, which became effective October 14, 1966, established a contiguous fishery zone of nine nautical miles within which the United States exercises the same exclusive rights in respect to fisheries as in its territorial sea, subject to the continuation of traditional fishing by foreign states within this zone as may be recognized by the United States.

It is the intent of the Government of the United States to provide for the continuation of the present traditional fisheries of Canada. It appears appropriate that informal consultations at the technical level be held in order that mutual arrangements can be consummated.

Enclosure

Public Law 89-658.

Department of State,

Washington, November 29, 1966.

NOTE VERBALE FROM THE DEPARTMENT OF EXTERNAL AFFAIRS TO THE EMBASSY OF
THE UNITED STATES, DATED 11 OCTOBER 1967, AND DELIVERED 25 OCTOBER 1967

Department of External Affairs

Ottawa

1. Pursuant to the provisions of the Territorial Sea and Fishing Zones Act of 1964, the Canadian Government intends to begin implementing the straight baseline system referred to in that act as the basis for the delineation of Canada's territorial sea and contiguous fishing zone.
2. As a first step, the Government will publish very shortly a list of geographical co-ordinates of points to be joined by straight lines along the coast of Labrador and along the eastern and southern coasts of Newfoundland.
3. The new baselines will be effective immediately upon their establishment by Order-in-Council, with the exception that the traditional fishing activities of a certain number of countries, notably the U.S.A., will be allowed to continue in the areas where they have previously been conducted and to the extent that they have previously been exercised, pending the conclusion of bilateral negotiations relating to such activities.
4. The first list of geographical co-ordinates of points will be followed shortly by additional lists implementing the straight baseline system along other parts of the eastern and western coasts of Canada. The application of these new baselines will also be subject to the conditions set out in paragraph 3 above.

Ottawa,

October 11, 1967.

NOTE FROM THE DEPARTMENT OF STATE TO THE EMBASSY OF CANADA,
DATED 1 NOVEMBER 1967

Department of State

Washington

The Department of State refers to the Note Verbale of the Department of External Affairs of October 11, 1967, handed to the United States Embassy, Ottawa, October 25, 1967, concerning establishment by the Government of Canada of a straight baseline system for delineation of Canada's territorial sea and contiguous fishing zone. In this connection, the Department notes the statement made by Paul Martin, Secretary of State, External Affairs, before the External Affairs Committee of the House on October 26, 1967, and the Order of the Governor-General in Council on this subject issued October 26.

As the Government of Canada is aware, the United States Government considers the action of Canada to be without legal justification. It is the view of the United States that the announced lines are, in important and substantial respects, contrary to established principles of international Law of the Sea. The United States does not recognize the validity of the purported lines and reserves all rights of the United States and its nationals in the waters in question.

Department of State

Washington, November 1, 1967

AIDE-MÉMOIRE FROM THE EMBASSY OF CANADA TO THE DEPARTMENT OF STATE,
DATED 11 NOVEMBER 1967

Canadian Embassy

Ambassade du Canada

AIDE-MÉMOIRE

The Embassy of Canada presents its compliments to the Department of State and has the honour to refer to the United States Aide-Mémoire of November 1. The Canadian Government has noted the objections raised in that Aide-Mémoire concerning the decision of the Canadian Government to implement the straight baseline system as a means for delineating the baselines from which Canada's territorial sea and contiguous zones are measured. The Canadian Government is satisfied that the straight baseline system is being implemented by Canada in a manner wholly in accordance with the recognized principles of international law and regrets that it is not able to agree with the interpretation which has been placed *on this action by the Government of the United States*.

Washington, D.C.

November 11, 1967

Annex 35

(149)

FIGURE: PROPORTIONALITY TEST APPLIED TO THE CANADIAN LINE

Annex 36

NAVIGATING TROUBLED WATERS, A NEW POLICY FOR THE ATLANTIC FISHERIES,
[CANADA] TASK FORCE ON ATLANTIC FISHERIES, MICHAEL L. KIRBY, CHAIRMAN,
DECEMBER 1982, CHAPTERS 10 AND 12 (THE KIRBY REPORT)

[Not reproduced]

Annex 37

**ASSESSMENTS OF THE POTENTIAL YIELD FOR STOCKS IN SUBAREAS 2 THROUGH 5
AND STATISTICAL AREA 6**

[Not reproduced]

Annex 38

DISTRIBUTION OF FISH AND SHELLFISH STOCKS ON GEORGES BANK

Table 1: Percentages of Various Stocks Taken in the Northeastern Portion, and the Remaining Portion, of Georges Bank during an autumn 1966 bottom-trawl survey cruise of the United States Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., Dept. of Commerce

Table 2: Percentages of Various Stocks taken in the Northeastern Portion, and Remaining Portion, of Georges Bank during five spring and five autumn bottom-trawl survey cruises of the United States Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., Dept. of Commerce.

Table 3: Percentages of Various Stocks in the Northeastern Portion, and Remaining Portion, of Georges Bank during spring, summer, and autumn bottom-trawl survey cruises conducted by the United States Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., Dept. of Commerce.

The proportional distribution of stocks in the northeastern portion of Georges Bank, and the remaining portion of Georges Bank, was computed from research vessel bottom trawl survey data collected during cruises conducted by the United States Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., Department of Commerce. For these calculations, the survey data collected in each of the six statistical units corresponding to Georges Bank were identified. (See Canadian Memorial, ⁽¹²⁾ Figure 23). An abundance index of stock weight was computed for each. Weighting these abundance indices by the amount of trawable area in each statistical unit allowed computation of the proportion of each stock occupying the statistical unit. These proportions were then combined to establish the proportion of the stock in the northeastern portion of Georges Bank and the remaining portion of the Bank.

Table 1

Percentages of Various Stocks taken in the Northeastern Portion ¹ and the Remaining Portion ² of Georges Bank during an autumn 1966 bottom trawl survey cruise ³ of the United States Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., Dept. of Commerce.

Species	Per Cent of Stock (in Weight) In:	
	Northeastern Portion of Georges Bank	Remaining Portion of Georges Bank
Scallop	76.5	23.5
Herring	14.7	85.3
Cod	45.7	54.3
Haddock	34.4	65.6
Mackerel	14.5	85.5
Pollock	75.3	24.7
Cusk	31.0	69.0
Silver Hake	17.5	82.5
Red Hake	3.7	96.3
White Hake	16.0	84.0
Argentine	100.0	0.0
Yellowtail	15.0	85.0
Redfish	33.5	66.5
Lobster	2.0	98.0
American Plaice	6.6	93.4
Winter Flounder	32.9	67.1
Little Skate	5.8	94.2
Big Skate	20.1	79.9
Spiny Dogfish	2.6	97.4

¹ The Northeastern Portion of Georges Bank corresponds to statistical units, (12) 5Zej and 5Zem, (523, 524) as shown at Figure 23 of the Canadian Memorial.

² The Remaining Portion of Georges Bank corresponds to statistical units 5Zeh, (12) 5Zen, 5Zeg, and 5Zeo (521, 522, 525 and 526) as shown at Figure 23 of the Canadian Memorial.

³ Canada relies upon data from such cruises at p. 57, n. 25, and Annexes, Vol. IV, Section II, Annex 2, of its Memorial.

Table 2

Percentages of Various Stocks taken in the Northeastern Portion ¹, and Remaining Portion ², of Georges Bank during five spring and five autumn bottom trawl survey cruises ³ of the United States Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., Dept. of Commerce.

Species	Per Cent of Stock (in Weight) In:		Autumn	
	Spring			
	Northeastern Portion of Georges Bank	Remaining Portion of Georges Bank	Northeastern Portion of Georges Bank	Remaining Portion of Georges Bank
Scallops	46.7	53.3	64.1	35.9
Herring	10.4	89.6	0.0	100.0
Cod	67.9	32.1	43.5	56.5
Haddock	43.9	56.1	87.5	12.4
Mackerel	0.3	99.7	2.4	97.6
Pollock	64.6	35.4	64.4	35.6
Cusk	46.6	53.4	43.6	56.4
Silver Hake	4.5	95.5	29.4	70.6
Red Hake	5.8	94.2	5.7	94.3
White Hake	11.9	88.1	25.7	74.3
Argentine	94.5	5.5	73.2	26.8
Loligo Squid	0.0	100.0	2.5	97.5
Yellowtail	19.8	80.2	5.4	94.6
Illex Squid	0.0	100.0	31.9	68.1
Redfish	0.2	99.8	6.4	93.6
Lobster	21.1	78.9	10.0	90.0
American Plaice	10.6	89.4	6.6	93.4
Winter Flounder	22.2	77.8	16.9	83.1
Lite Skate	10.1	89.9	17.8	82.2
Big Skate	17.0	83.0	39.5	60.5
Spiny Dogfish	25.2	74.8	49.4	50.6

(12) ¹ The Northeastern Portion of Georges Bank corresponds to statistical units 5Zej and 5Zem (523, 524), as shown at Figure 23 of the Canadian Memorial.

(12) ² The Remaining Portion of Georges Bank corresponds to statistical units 5Zeh, 5Zen, 5Zeg, and 5Zeo (521, 522, 525 and 526) as shown at Figure 23 of the Canadian Memorial.

³ Canada relies upon data from such cruises at p. 57, n. 25, and Annexes, Vol. IV, Section II, Annex 2, of its Memorial. The spring cruises included in this table are: 1972, 1973, 1974, 1976, and 1978. The autumn cruises included in this table are: 1972, 1973, 1974, 1975, and 1977.

Table 3

Percentages of Various Stocks in the Northeastern Portion¹, and Remaining Portion² of Georges Bank during spring, summer, and autumn bottom-trawl survey cruises³ conducted by the United States Northeast Fisheries Center, National Marine Fisheries Service, N.O.A.A., Dept. of Commerce.

Species	Area	Spring			Summer			Autumn		
		1978	1979	1980	1978	1979	1980	1978	1979	1980
Cod	Northeastern Portion	58.5	63.0	47.8	24.7	23.2	75.7	44.1	56.5	55.7
	Remaining Portion	41.5	37.0	52.2	75.3	76.8	24.3	55.9	43.5	44.3
Haddock	Northeastern Portion	52.7	59.7	78.1	17.2	37.5	96.1	67.2	41.3	67.6
	Remaining Portion	47.3	40.3	21.9	82.8	62.5	3.9	32.8	58.7	32.4
Pollock	Northeastern Portion	84.2	21.7	82.0	0.0	3.5	29.4	37.1	42.9	17.6
	Remaining Portion	15.8	78.3	18.0	100.0	96.5	70.6	62.9	57.1	82.4
Silver Hake	Northeastern Portion	2.3	8.4	0.7	9.2	7.7	4.1	9.9	24.4	17.5
	Remaining Portion	97.7	91.6	99.3	90.8	92.3	95.9	90.1	75.6	82.5
Yellowtail Flounder	Northeastern Portion	6.2	39.8	63.2	13.1	3.4	0.8	6.4	8.0	53.6
	Remaining Portion	93.8	60.2	36.8	86.9	96.6	99.2	93.6	92.0	46.4
Winter Flounder	Northeastern Portion	2.7	29.5	4.4	19.8	38.9	0.0	26.3	26.2	18.7
	Remaining Portion	97.3	70.5	95.6	80.2	61.1	100.0	73.7	73.8	81.3
Red Hake	Northeastern Portion	15.3	4.8	1.8	0.0	2.3	0.0	13.6	33.2	25.0
	Remaining Portion	84.7	95.2	98.2	100.0	97.7	100.0	86.4	66.8	75.0
Cusk	Northeastern Portion	40.9	0.0	31.2	0.0	100.0	17.8	8.7	12.6	9.8
	Remaining Portion	59.1	100.0	68.8	100.0	0.0	82.2	91.3	87.4	90.2

¹ The Northeastern Portion of Georges Bank corresponds to statistical units 5Zej and 5Zem, (523, 524) as shown at Figure 23 of the Canadian Memorial.

² The Remaining Portion of Georges Bank corresponds to statistical units 5Zeh, 5Zen, 5Zeg, and 5Zeo (521, 522, 525 and 526) as shown at Figure 23 of the Canadian Memorial.

³ Canada relies upon data from such cruises at p. 57, n. 25, and Annexes, Vol. IV, Section II, Annex 2, of its Memorial. The cruises included in this table were conducted from 1978 through 1980.

Annex 39

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Annex 44**CERTIFICATION**

I, the undersigned, Davis R. Robinson, Agent of the United States of America, hereby certify that each document included in the Annex or Counter-Memorial submitted by the United States of America is an accurate translation, transcription, reproduction, or representation.

(Signed) _____
DAVIS R. ROBINSON
Agent of the United States
of America
