

International Management of Whales and Whaling: An Historical Review of the Regulation of Commercial and Aboriginal Subsistence Whaling

RAY GAMBELL¹

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ABSTRACT. The exploitation of whales has spread over the centuries from coastal to international waters, and from pole to pole. Despite the successive depletion of one species and stock after another, not until the 20th century were attempts instituted to regulate the industry and the catches at an international level.

Agreements among the whaling companies competing in the Antarctic in the 1930s were closely followed by intergovernmental agreements, culminating in the 1946 International Convention for the Regulation of Whaling, which established the International Whaling Commission. In 1975 the commission adopted its "new management procedure" for commercial whaling, based on the concept of maximum sustainable yield. A separate but related management procedure for subsistence whaling operations was subsequently developed, largely because of the problems of the Alaskan bowhead hunt. This gave greater weight to the perceived dependence of the native communities on the hunt than to the status of the whale stock.

The tensions between the objectives of the conservation of the whale resources and the orderly development of the whaling industry continue today. Commercial whaling is for the moment prohibited while a comprehensive assessment of stock status and trends is undertaken, together with the development of a revised management procedure. The impact of recent legislative thinking in the United Nations Conference on the Law of the Sea, coastal state sovereignty, and the developing trend towards the precautionary principle of management has caused profound changes in the interpretation and application of the 1946 convention and the consequent management policies by which it is implemented.

Key words: aboriginal, bowhead, conservation, exploitation, International Whaling Commission, management, regulation, subsistence, whaling

RÉSUMÉ. L'exploitation des baleines s'est étendue, au cours des siècles, depuis les eaux côtières jusqu'aux eaux internationales, et d'un pôle à l'autre. Malgré l'épuisement successif des espèces et des stocks, il fallut attendre le XX^e siècle pour que des essais soient entrepris afin de réglementer l'industrie et les prises au niveau international.

Les accords conclus dans les années 30 entre les sociétés baleinières qui étaient en concurrence dans l'Antarctique ont été suivis de près par des accords intergouvernementaux, pour aboutir en 1946 à la Convention internationale pour la réglementation de la chasse à la baleine, qui établit la Commission baleinière internationale (CBI). En 1975, la Commission adopta sa «nouvelle procédure de gestion» pour la chasse commerciale à la baleine, fondée sur le concept du rendement équilibré maximal. Une procédure de gestion connexe mais distincte, concernant la chasse de subsistance a été mise au point par la suite, en raison surtout des problèmes de la chasse à la baleine boréale en Alaska. Cette dernière procédure accordait plus de poids à l'importance de la chasse pour les communautés indigènes qu'au statut du stock baleinier.

Les tensions entre les objectifs de conservation des ressources baleinières et le développement ordonné de l'industrie baleinière persistent encore de nos jours. La chasse commerciale est, pour l'instant, interdite pendant qu'on entreprend une évaluation en profondeur de l'état et des tendances du stock, et qu'on révisé la procédure de gestion. Les retombées des discussions récentes sur la législation lors de la Conférence des Nations Unies sur le droit de la mer, la souveraineté des États côtiers, et la tendance croissante vers le principe de gestion préventive, ont causé de profonds changements dans l'interprétation et dans l'application de la Convention de 1946, ainsi que dans les politiques de gestion résultantes grâce auxquelles elle est mise en application.

Mots clés: aborigène, baleine boréale, conservation, exploitation, Commission baleinière internationale, gestion, réglementation, subsistance, chasse à la baleine

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THE HISTORY OF COMMERCIAL WHALING

Records of the hunting of whales are found since the beginning of history. The first industry that can be identified is the catching of black right whales by the Basques in the Bay of Biscay area of the North Atlantic, which dates from at least as early as the 12th century (Ellis, 1991). As these stocks were reduced, the whalers were forced to search farther afield, until the North American coast was reached by the 16th century. British and Dutch vessels expanded the hunt to the Greenland, or bowhead, whale in arctic waters in the 17th century (Jackson, 1978). The next century saw the rise of the sperm whale fishery as a worldwide enterprise. The American whalers from New England predominated in this phase of whaling, with British and other nationalities involved in the expansion from the Atlantic into the Pacific and Indian oceans (Berzin, 1972). Southern and northern right whales, as well as bowhead whales, were all seriously reduced by the beginning of the 20th century, together with the Pacific gray whales migrating close to the North American coast. Apart from the latter, these various fisheries were targeted on the relatively slow-swimming species,

which usually float when killed. The operations were carried out from open boats under sail or oars, initially using hand harpoons and lances, which were largely replaced by darting guns and bomb lance guns in the second half of the 19th century (Mitchell *et al.*, 1986). Parallel with the European-style whaling, there was also a separate Japanese coastal fishery using hand harpoons and, from 1675, a netting technique, mainly for humpback, right, and gray whales (Omura, 1984).

The advent of modern whaling can be dated from 1864, when the Norwegian combination of an explosive grenade harpoon fired from a cannon mounted on a powered catcher boat brought even the fastest swimming and largest whale species, such as the blue, fin, and sei whales, within reach (Tønnessen and Johnsen, 1982). This technology spread widely in the North Atlantic whaling operations, so that the whales within reach of the coastal stations were depleted. Whaling along Norwegian lines was first attempted in eastern Asia in 1889 off the coast of Korea (Risting, 1931). The hunt spread farther afield and eventually extended to the rich and productive waters of the Antarctic. The first land station opened on South Georgia in 1904, and there followed a rapid expansion with floating factory

¹International Whaling Commission, The Red House, 135 Station Road, Histon, Cambridge CB4 4NP, United Kingdom
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ships in sheltered harbours where the whales were flensed alongside and the blubber and flesh hoisted aboard. The restriction of a land base was overcome in 1925 when the first floating factory ship with a stern slipway, making it possible to haul whales on deck for processing even on the open seas, was brought into commission. Within five years there were 6 shore stations, 41 British and Norwegian factory ships, and 232 whale catchers working in the Antarctic (Jahn, 1937). The decline in the industry after the 1930s was given a brief respite by the 1939-45 war, but reduction of many of the major whale stocks in these oceans continued until a pause in all commercial whaling was introduced throughout the world for the member nations of the International Whaling Commission, in effect from the 1986 whaling season.

INTERNATIONAL REGULATION

During the entire history of whaling, once the local coastal stocks were exhausted, the catching operations were conducted in the international areas that came to be known as the high seas, under a doctrine of freedom of access that can only be limited by the consent of the participant states (Birnie, 1985). Whales are regarded as a common property resource, which implies that no single user has a right to the resource, nor can they prevent others from sharing in its exploitation. But the history of fisheries and whaling has demonstrated time and time again that this has led to over-exploitation of the resources.

The origin of the doctrines of the freedom of the seas and common property resources go back at least to Roman times. During the succeeding centuries states made use of the concepts to strengthen their arguments for refuting exclusive fishing rights claimed by other countries and to allow freedom of navigation.

The 1931 Convention

The first positive step on an international level to regulate whaling throughout the world, and particularly to bring order and control into the Antarctic whale fishery, was the Convention for the Regulation of Whaling signed in Geneva in 1931 (League of Nations Treaty Series, CLV, 349). It did not come into force until 16 January 1935, after the requisite number of ratifications had been received. The convention applied to all waters, including both the high seas and national and territorial waters, but was only applicable to baleen whales and provided exemptions for aboriginal subsistence whaling (see below). The taking of right whales, calves or suckling whales, immature whales, and females accompanied by calves or suckling whales was prohibited. Payments to gunners and crews was to depend more on the size and value of the catch than the sheer numbers caught to encourage a preference for the larger animals and protection of the smaller, immature whales. It also provided for the licensing of whaling vessels and the collection of statistics of the catches.

These measures had rather little effect on the Antarctic operations because not all the countries whaling in the area adhered to the convention, particularly Germany and Japan, which were new entrants to the Antarctic fishery. However, the convention did establish the principle of international regulation of a common property resource in the high seas. In particular, it gave a legal framework for the voluntary production agreements entered into by the whaling companies after the gross over-production of oil in the 1930-31 Antarctic

season. As a result of the uncontrolled and great slaughter that took place in that season, more oil was produced than there was a market to consume, and Norway kept its fleet in port the following year. The whaling companies decided to try to stabilize the market by restricting the amount of oil produced, but the power of such voluntary arrangements between commercial enterprises needed the re-enforcement of a formal treaty to ensure concerted government action. Nonetheless, the whaling companies had established a restricted and later open season for Antarctic whaling, when the whales had grown fatter during the summer feeding period, and minimum size limits for blue and fin whales, both measures designed to encourage increased output of oil per whale.

The 1937 Agreement

Because the 1931 convention was not performing a useful function, a new International Agreement for the Regulation of Whaling was signed by nine nations, including Norway, the United Kingdom, and Germany, in 1937 (League of Nations Treaty Series, XCX, 79). This gave complete protection to the depleted stocks of right and gray whales and set minimum size limits for blue, fin, humpback, and sperm whales, as well as forbidding the capture of females accompanied by calves. The Antarctic pelagic whaling season was restricted to three months from December to March and large parts of the world's oceans north of 40°S latitude were closed to factory ship operations. An exception was made in the North Pacific as a concession to Japan, although Japan decided to stay outside the agreement because it felt that its newly developed whaling industry should not be restricted in this way. Enforcement of the regulations was assisted by the arrangements for flag nations to appoint a government inspector to each factory ship.

The 1937 agreement applied to all waters in which whaling was prosecuted by factory ships and whale catchers, and governments were required to record statistics of the vessels, catches, certain biological information concerning the whales, and the quantities of the various products obtained.

The 1938 Protocol

A further international conference held in 1938 adopted some additional regulations as a protocol to the 1937 agreement (League of Nations Treaty Series, CXCVI, 131). These included a ban on taking humpback whales in the Antarctic because of the depleted state of the stocks and the designation of a whale sanctuary in the Pacific sector of the Antarctic between longitudes 70°W and 160°W.

The 1944 and 1945 Protocols

A most important development in 1944 was the decision to set an overall catch limit in the Antarctic. The Whaling Committee of the International Council for the Exploration of the Sea had recommended in 1938 that a limit should be set on the total amount of oil produced. Such a move was not considered practicable at that time because of the size and number of competing fleets in the Antarctic whale fishery. However, by 1944 the situation had changed, since many of the whaling factory ships had been sunk during the war and it was possible to set a maximum catch limit well below the pre-war catch level without placing unacceptable restrictions on the remaining fleets. To simplify the system and not to discriminate between the companies and nations concerned, it was decided to use the

Blue Whale Unit (BWU) as the governing criterion. This was based on the oil production regulation developed by the industry in the 1930s and made 1 blue whale = 2 fin = 2½ humpbacks = 6 sei whales. The first limit set for the 1946/47 Antarctic season was of 16 000 BWU, about two-thirds of the average catch in the pre-war years (United Nations Treaty Series, 148).

THE INTERNATIONAL CONVENTION FOR
THE REGULATION OF WHALING, 1946

The culmination of the pre-war efforts to protect the whale stocks and regulate the whaling industry came in 1946 when an International Whaling Conference was convened by the United States government in Washington, D.C., at the end of 1946. The conference adopted a new convention, by which according to the Preamble:

The Governments . . .

Recognising the interest of the nations of the world in safeguarding for future generations the great natural resources represented by the whale stocks;

Considering that the history of whaling has seen over-fishing of one area after another and of one species of whale after another to such a degree that it is essential to protect all species of whales from further over-fishing;

Recognising that the whale stocks are susceptible of natural increases if whaling is properly regulated, and that increases in the size of whale stocks will permit increases in the number of whales which may be captured without endangering these natural resources;

Recognising that it is in the common interest to achieve the optimum level of whale stocks as rapidly as possible without causing widespread economic and nutritional distress;

Recognising that in the course of achieving these objectives, whaling operations should be confined to those species best able to sustain exploitation in order to give an interval for recovery to certain species of whales now depleted in numbers;

Desiring to establish a system of international regulation for the whale fisheries to ensure proper and effective conservation and development of whale stocks on the basis of the principles embodied in the provisions of the International Agreement for the Regulation of Whaling, signed in London on 8th June, 1937, and the protocols to that Agreement signed in London on 24th June, 1938, and 26th November, 1945;

. . . decided to conclude a convention to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry [IWC, 1950:9-10].

The 1946 convention established the International Whaling Commission (IWC), which formulates regulatory measures and is responsible for their application. The convention includes a Schedule of regulations, which are open to amendment by a three-quarters majority of the members of the commission voting. These measures, among other things, provide for the complete protection of certain species, designate specified areas as whale sanctuaries, set limits on the maximum numbers of whales that may be taken in any one season, prescribe open and closed seasons and areas for whaling, set limits on the sizes of whales that may be killed, and prohibit the capture of suckling calves and female whales accompanied by calves. There is also a requirement to compile and submit catch reports and other statistical and biological records. In addition, the commission encourages, coordinates, and funds whale research, publishes the results of these and other scientific research, and promotes

studies into related matters, such as the humaneness of the killing operations.

The regulations first adopted were closely modelled on the agreements reached among the whaling nations in the pre-war years. They have been amended subsequently in light of changing circumstances and the acquisition of better knowledge. Whenever changes are made to the Schedule provisions there is a 90-day period before they become effective, during which any government can lodge an objection. If this occurs there is a further period of 90 days during which any other government can also lodge an objection, after which the amendment to the Schedule becomes binding on all governments that have not objected. This escape clause was designed to allow governments not to be bound by regulations they considered detrimental to their own best national interests. It has meant that some conservation measures have not been fully effective, or their enforcement has been deferred, but it is doubtful if the convention itself could have been approved without such an arrangement.

The history of the early years of the IWC was not a good one from the viewpoint of the conservation of the whale stocks, particularly those in the Antarctic (McHugh, 1974; Macintosh, 1965; Scarff, 1977). The overall quota system led to each whaling operation racing to take the largest share of the total catch permitted, because the convention explicitly debarred the commission from restricting the number or nationality of factory ships or land stations or allocating quotas to them individually or in groups. In addition, the catch limit was maintained at far too high a level at the insistence of the whaling countries, reflecting the demands of their whaling companies, despite the obvious decline in the whale stocks. Because agreement could not be reached outside the commission on national quotas, as a means of attempting to reduce the "Whaling Olympics" that had developed, the Netherlands and Norway withdrew from the commission in 1959. No catch limits at all were set for the next two seasons, but finally an agreement was reached in 1962 outside the commission among the five Antarctic whaling nations establishing national quotas as percentages of the IWC catch limit, and the Netherlands and Norway rejoined the commission.

MANAGEMENT PROCEDURES

The first steps towards the development of science-based management of the whaling industry began as a result of the chaos described above in reaching a satisfactory arrangement for the national shares of the total catch limits for the Antarctic whale fishery. In 1961 the IWC appointed a special committee of three experts in population dynamics drawn from countries not engaged in pelagic whaling in the Antarctic. They were asked to make an independent analysis of the baleen whale stocks and appropriate recommendations to the commission. The Committee of Three — made up of Dr. D.G. Chapman, of the United States, Mr. K.R. Allen, then of New Zealand, and Mr. S.J. Holt, from the United Nations Food and Agriculture Organization in Rome — was later expanded to Four by the addition of Dr. J. Gulland, of the United Kingdom. The work of these experts brought into the analysis of the whale stocks the mathematical methods and techniques newly developed for fisheries assessment. By cooperation with the IWC Scientific Committee (made up of scientists from the member nations), the catch data and biological information available were

subjected to rigorous analysis to determine the size of the stocks and the level of yield they could sustain (Chapman *et al.*, 1964).

As a result of the recommendations of the special committee, humpback whales were given complete protection south of the equator and blue whales for most of the area south of 40°S in 1963 (complete protection for blue whales in the Southern Hemisphere came into effect in 1967). The commission expressed its intention of bringing the Antarctic catch limit into line with the scientific findings by 1964, but having regard for the interests of the consumers of the whale products and the industry itself. In the event, those countries engaged in whaling could not see their way to accept such a drastic reduction of the 1963/64 catch limit as the scientific evidence indicated, while the non-whaling countries were unable to vote for any limit substantially higher than warranted by this evidence (IWC, 1966a). Because of the impossible situation that had developed, a special meeting of the commission was held in May 1965 to resolve the problem of the Antarctic quotas. It was agreed that over a three-year period the catch limit would be reduced to below the sustainable yield of the stocks estimated according to the best scientific advice available (IWC, 1966c). Unfortunately, there was a delay in the full implementation of this decision due to a downward revision of the sustainable yields calculated by the scientists because of a new understanding of age determination in the whales and their life spans. Finally the catch limits were set by individual species rather than by Blue Whale Units in 1972.

This year, 1972, also finally saw the implementation of the International Observer Scheme, whereby observers appointed by the commission and reporting directly to it were stationed at the whaling operations of the member states to confirm their compliance with the agreed whaling regulations (IWC, 1974). These arrangements were set up through formal agreements among governments with similar areas of interest, so that observer schemes came into operation for the Southern Hemisphere pelagic whale fishery, Southern Hemisphere land stations, North Atlantic land stations, North Pacific pelagic whaling, and North Pacific land stations. Because the whaling nations were the only ones, in general, who were prepared to finance these schemes, it was necessary for the observers to be nominated and exchanged on a bilateral basis among the active parties. Thus Japan and the U.S.S.R. exchanged observers on their North Pacific and Antarctic factory fleets; Australia and South Africa exchanged observers at their land stations; and Canada, Iceland, Norway, and Spain exchanged observers in the North Atlantic area; however, the U.S. did send observers to the Japanese land stations.

The 1975 Procedure

In 1974 the IWC adopted a formal management procedure in partial reaction to calls for a ten-year moratorium on commercial whaling, as advocated by the United Nations Conference on the Human Environment held in Stockholm two years earlier. This management regime, often and confusingly called the New Management Procedure, was designed to regulate the catches from each stock on an individual basis, rather than by some blanket action. The procedure was based on the concept of the maximum sustainable yield (MSY). The theory behind this approach is that through the interplay of the natural responses for a stock to increase when its numbers are reduced, at each particular size of stock there is a certain surplus of recruitment

over natural mortality. This is low when the stock is at or close to its initial, unexploited level and also at very low stock levels, and it increases to a maximum at some intermediate point somewhere around 50-60% of the original abundance. This yield represents a harvest that can be taken for an indefinite time without further depleting the stock. The biological mechanisms involved in the enhanced rate of recruitment probably include a reduction in the age at sexual maturity and an increase in the pregnancy and survival rates. These are possibly brought about by improved feeding conditions for the survivors in populations reduced by hunting, which among other things result in increased growth rates and ovulation frequencies (Gambell, 1973).

Under this new management procedure, stocks were to be classified on the advice of the Scientific Committee into one of three categories according to their abundance relative to the level providing the MSY. A "sustained management stock" was between 10% below and 20% above the MSY level. Catches were to be set at not more than 90% (to give some margin of safety) of the MSY for these stocks, with a progressive reduction for any stocks estimated to lie between the MSY level and 10% below that level. A similar level of catch of 90% of the MSY, with some alternative arrangements in certain circumstances, was prescribed for a stock more than 20% above the MSY stock level, termed an "initial management stock." A stock more than 10% below the MSY stock level was designated a "protection stock," and no commercial whaling was permitted on such a stock in order to allow the maximum rate of recovery towards the MSY level (IWC, 1977).

RECENT DEVELOPMENTS IN MANAGEMENT

The difficulties associated with the New Management Procedure for commercial whaling have been well documented in the reports of the IWC Scientific Committee, leading to the extensive efforts under way to develop revised procedures. Unfortunately, although the procedure looked very attractive in principle, the Scientific Committee found that full implementation was difficult. Problems arose from the fact that estimating the MSY, the stock level at which the MSY can be taken (MSYL), and the initial level prior to the start of exploitation turned out not to be simple tasks. Even when estimates of these values were made for a particular stock, the changes in estimates as they were updated annually often led to wide fluctuations in catch limits, especially for stocks estimated to be close to the MSYL. The effect of these problems was that by the early 1980s the Scientific Committee found it almost impossible to reach agreement on any recommendations for the classification or catch limits of stocks subject to commercial whaling, other than those for protection stocks. This was an important factor in the 1982 decision of the commission to implement a pause in commercial whaling in effect from the 1986 season (Kirkwood, 1992).

The Revised Management Procedure

In 1982 the IWC adopted a proposal to include in the Schedule to the Convention the following, which had the effect of instituting at least a temporary pause in commercial whaling (commonly known as the "moratorium"):

. . . catch limits for the killing for commercial purposes of whales from all stocks for the 1986 coastal and the 1985/86 pelagic seasons and thereafter shall be zero. This provision will

be kept under review, based upon the best scientific advice, and by 1990 at the latest the Commission will undertake a comprehensive assessment of the effects of this decision on whale stocks and consider modification of this provision and the establishment of other catch limits [IWC, 1983:21].

The IWC then embarked on the process that came to be known as the "comprehensive assessment" of whale stocks. This was defined by the scientists as an in-depth evaluation of the status and trends of all whale stocks in the light of management objectives and procedures. As a direct result of this initiative five alternative management procedures were developed by individuals or pairs of scientists and tested by a series of simulation trials. The purpose of this exercise was to overcome the difficulties identified with the existing procedure, which is tied to the concept of MSY and a need to have estimates of initial and current population sizes as well as the series of other parameters necessary to determine the population trajectory and MSY level.

An account of the meetings and studies up to 1989, together with some of the early work undertaken in this enterprise, has been published (Donovan, 1989). This covers the initial consideration of scientific aspects of simulation and theoretical studies of alternative management strategies, as well as descriptions of the various management procedures under development. It became clear at an early stage from the amount of work involved in this process of testing and development that any new procedure could not be ready by the original deadline of 1990. However, through the work of the individual developers and their consultations and comparisons, these proposals came to the point where at its 1991 annual meeting the Scientific Committee (with a minority dissenting) recommended that the commission adopt one procedure (known as the "C" procedure, after its developer Dr. Justin Cooke) as suitable for implementation as replacement for the 1975 procedure (IWC, 1992b).

The commission formally adopted this procedure with some modifications as the core single stock management procedure for baleen whales upon which further development shall proceed. The Scientific Committee was charged with the task of providing further advice on the minimum standards for data, including coverage and methodology for sighting surveys, analytical techniques, and acceptable levels of precision. It also has to address the development of multistock management procedures, based on the modified core procedure (IWC, 1992a). This work will be undertaken by the 1992 annual meeting of the commission, at which there will be some possibility of catch limits other than zero being set for certain stocks that have been the subject of the comprehensive assessment process.

The C Procedure

The aim of the C procedure is to provide a reasonable balance between conservation and exploitation of baleen whales and to provide a simple and convenient method for determining catch limits with minimal requirements for data. With respect to conservation, it aims to ensure that depleted stocks are rehabilitated and that stocks that are only lightly depleted to date are not reduced to below half their initial abundance. With respect to exploitation, it places greater weight on guaranteeing at least some catch in all cases where appropriate, rather than trying to obtain a high but unreliable catch level in only some cases (Kirkwood, 1992).

To determine catch limits each main region, such as the Antarctic, North Atlantic, or North Pacific, is divided into appropriate sub-areas. The input data required are one or more estimates of absolute abundance derived from sightings surveys and all previous known catches in the sub-area by year. A very simplified population model is fitted to these data. The model has only two estimatable parameters — one relating to overall stock size and the other relating to relative stock productivity. By fitting the model to the data, estimates of the current abundance, maximum sustainable exploitation rate, and stock depletion relative to the unexploited level are obtained. Nominal catch limits are related to these quantities by a simple formula. The nominal catch limit, as a proportion of current stock size, is zero when the stock is depleted to less than 50% of the initial level. For stocks above this level the limit varies linearly with the estimated stock depletion, rising to one-and-a-half times the estimate of maximum sustainable exploitation rate for stocks not depleted at all. The nominal catch limits do not translate directly into the actual catch limits to be set, since the abundance estimates are not exact. A range of nominal catch limits is calculated, along with the probability of each value, and the median of this range becomes the actual catch limit.

After this core procedure has been applied to each sub-area, it is applied to the whole region. If the regional catch limit exceeds the sum of the sub-area limits, then neither the sub-area nor the regional catch limits may be exceeded. Catch limits are recalculated each year that new abundance data become available, except that the time between recalculations is never less than two years or more than six. The catch limits remain constant until recalculated, unless more than ten years have elapsed since the last survey of abundance, when a special rule comes into effect reducing the catch limit by 20% of the average catch of the ten preceding years each year until either new data are provided or the catch limit becomes zero.

When the IWC adopted this model as its revised management procedure, it imposed a modification that had the effect of increasing the internal protection level in the model to 54%, and it also set the objective of achieving a final median population size after 100 years of 72% of the unexploited level.

RECOGNITION OF ABORIGINAL SUBSISTENCE WHALING

The first Schedule to the 1946 International Convention for the Regulation of Whaling included as its second paragraph: "It is forbidden to take or kill gray whales or right whales, except when the meat and products of such whales are to be used exclusively for local consumption by the aborigines" (IWC, 1950:15). This exception clause thus carried forward the conceptual approach found in the exception contained in Article 3 of the International Convention for the Regulation of Whaling signed in Geneva in 1931: "The present Convention does not apply to aborigines dwelling on the coasts of the territories of the High Contracting Parties provided that — 1. They use canoes, pirogues or other exclusively native craft propelled by oars or sails. 2. They do not carry firearms. 3. They are not in the employment of persons other than aborigines. 4. They are not under contract to deliver the products of their whaling to any third person" (Birnie, 1985:681-682).

This exemption was not included in the Whaling Agreement of 1937, which specifically prohibited the taking of right whales, but although the United States signed this treaty, and Canada the 1938 Protocol, aboriginal whaling for bowheads continued

in Alaska (Durham, 1979) and to a much lesser extent in Canada (Mitchell and Reeves, 1982). Both Canada and the U.S. were founder members of the IWC, but Canada withdrew on 30 June 1982.

Aboriginal subsistence whaling has therefore been recognized by international treaty for 60 years as in some ways being different and having a distinctive character, making it susceptible to other controls than those on the larger-scale commercial whaling operations. In the 1931 and 1946 agreements codifying the regulations governing the commercial catching activities, aboriginal subsistence whaling was identified only as exempt from the general restrictions and requirements spelled out.

THE BOWHEAD PROBLEM

At the same time as the IWC was strengthening its conservation policy by putting into effect in 1975 the new management procedure for commercial whaling operations, the Scientific Committee was expressing increasing concern over the trend in the catches of the bowhead whale by Alaskan Eskimos (Gambell, 1983). This eventually led to the development of a specific management regime for aboriginal subsistence whale fisheries.

The people of these arctic communities have a long history and culture based upon the hunting of these whales, but the bowhead numbers were severely depleted by commercial whaling activities (IWC, 1982). The commercial fishery on the western arctic bowhead whales started in 1848, when the first American whaling vessel started pelagic whaling in the Arctic Ocean after working through the Bering Strait, and finished about 1914 because of the lack of whales and the collapse of the market for the most important product, the baleen. Thereafter the native people continued their traditional hunt, using their old methods and skills, augmented by the 19th-century technology they had acquired from contact with the commercial whalers (Marquette and Bockstoce, 1980).

The catches continued at a modest level of around 12 animals landed each year from 1910 to 1969. During the next eight years there was a significant increase in the catch, averaging 32 animals landed per year to 1977 (Marquette and Bockstoce, 1980). This increase in catch was possibly in reaction to restrictions placed on the take of caribou from the western arctic herd, which had declined sharply since 1970. There was also a greater amount of money available to support whaling activities in the coastal communities as a result of the petroleum exploration and extraction opportunities in the area and the settlement of compensation claims for land rights. More worrying than the increase in the number of whales being landed, though, was the fact that the number of whales struck but lost, and possibly dying from their injuries, increased greatly from 10 in 1973 to 79 in 1977. This change was probably associated with a progressive change from using a darting gun with line attached to a greater reliance on the shoulder gun, which has no fixing line and with a poor record with respect to bomb detonation. Another major factor was the increase in the whaling effort and the associated number of relatively inexperienced crews.

Scientific assessments of the size of the bowhead whale population around Alaska suggested that there had been 11 700 to 18 000 whales at the initial level in 1850, but that the stock in 1977 numbered only 600 to 2000 animals and that the kill rate of 5% was increasing (IWC, 1978b). There were also

concerns over habitat pollution and degradation from the development of hydrocarbon exploration and extraction activities. The IWC Scientific Committee commented that the reduction of the bowhead whale to a small fraction of its initial population presented serious questions about its ability to survive natural fluctuations that might reduce it below some critical level where extinction is likely, exacerbated by continued exploitation and the possibility of natural disasters. Accordingly there appeared to be a clear scientific case to be made for a suspension of catching this species in the hope that this would permit the stock to recover to a somewhat safer level (IWC, 1978b).

The commission responded to this situation at its June 1977 annual meeting by deleting the aboriginal subsistence exception clause for right whales, thus banning all hunting of bowheads, recognized to be the most endangered of the whales (IWC, 1978a). This was obviously a very drastic measure, but the evidence presented by scientists indicated there was a real risk that the increasing slaughter of the whales, many of which were going to waste, would lead to the extinction of the stock in the foreseeable future.

Unfortunately, the concerns that had been voiced over the status and need for more information on the bowhead whale in the Scientific Committee of the IWC from 1972 onwards were not conveyed by the U.S. government to the Eskimo people until 1977. By this time the decision had been made to end the bowhead hunt, and the Eskimo whalers reacted quickly by forming the Alaska Eskimo Whaling Commission, composed of one representative of each of the nine whaling villages. Their purpose was to overturn the ban on their traditional subsistence hunt of the bowhead whale, to disseminate information on the nutritional and cultural significance to the Eskimo people of the bowhead whale, and to promote scientific research on the whales and their abundance (Adams, 1982).

Through legal proceedings and persistent lobbying, the Eskimo community persuaded the U.S. government to press for a modest take of bowhead whales to satisfy their subsistence and cultural needs. This catch was to be coupled with a scientific research program on the whale stock and a series of regulatory measures intended to reduce the loss rate in the hunt.

TOWARDS AN ABORIGINAL SUBSISTENCE WHALING POLICY

The IWC was still reluctant to accept the full catch requested by the U.S. on behalf of the Eskimos, since the Scientific Committee continued to urge extreme caution in allowing any catch. At the 1978 meeting, for example, the Scientific Committee had available an improved population estimate resulting from the substantial U.S. research program, with an estimate of 2260 bowhead whales off the Alaskan coast. This figure was higher than previous estimates, mainly due to a large increase in survey effort, different environmental conditions, and better location of the survey positions. However, the number of calves counted led to an estimate of only 29 calves in the population. There are difficulties in sighting calves and they may be segregated away from the main body of the migrating whales, but the Scientific Committee was concerned that the normal recovery process of the stock may have been altered and therefore considered that caution was necessary (IWC, 1979b). Because of the many problems involved, the commission decided that a special working group should be established to examine the entire aboriginal whaling problem and develop proposals for a regime for the aboriginal bowhead hunt in Alaska

and, if appropriate, a regime or regimes for other aboriginal hunts (IWC, 1979a).

In 1979 the commission convened three panels of experts to provide information to help this Technical Committee Working Group in devising a management program that would satisfy both the hunters and the very strong conservation lobby (Gambell, 1982). The panels were concerned with wildlife science and the nutrition and culture of the aboriginal peoples. The conclusions drawn were that in strictly biological terms no Bering Sea bowhead whales should be hunted if the population is to have the best prospect for recovery. There are a number of alternative sea mammal and other wildlife resources available to replace the bowhead whale in the lives of the northwest Alaskan Eskimos. In nutritional terms, assuming replacement with foods of equivalent value, the diet of the Eskimos would not be adversely affected by removing the bowhead from the diet. However, this change would certainly have a significant impact on the culture of these whaling communities. Any attempt to introduce controls should involve the local communities to the fullest extent possible to determine their effects and to achieve full acceptance (IWC, 1982).

The commission received and reviewed the report of this panel meeting and of the Technical Committee Working Group, which had proposed a dual system of management involving research and management to be undertaken by the U.S. and a schedule amendment that set a ceiling to any catches taken. There were still considerable difficulties in attempting to reconcile the scientific advice for minimal catches and the aboriginal dependence on the catches. A resolution was therefore adopted stating that the IWC would institute a management regime taking account of the documented need of the aborigines and the estimated net recruitment of the whale stock or, recognizing the difficulty in estimating the latter, a percentage of the current population size (IWC, 1980). The commission intended that the needs of the Eskimos should be documented by the U.S. government based on 1) the importance of the bowhead in the traditional diet, 2) possible adverse effects of shifts to non-native foods, 3) availability and acceptability of other food sources, 4) historical take, 5) the integrative functions of the bowhead hunt in contemporary Eskimo society and the risk to the community identity from an imposed restriction on native harvesting of the bowhead, and 6) to the extent possible, ecological considerations.

The commission understood that the U.S. would adopt a national management plan designed to establish catch limits and reporting and data requirements, allow for reduction in the struck and lost rate, and implement an appropriate research plan. In accordance with this resolution, the U.S. presented an interim report to the IWC in 1980 that discussed the historical, cultural, and nutritional aspects of the bowhead fishery and attempted to quantify the needs of the Eskimos as follows (summarized from Donovan, 1982).

Historic Need

The available catch data by village for 1930-69 were used as the period during which it was considered that the take of bowheads both met Eskimo needs and was not affected by external factors. It was found that for the two villages where sufficient information was available, there had been an almost uniform decline in the per capita whale catch. Several possible explanations were advanced, including the increasing availability

of other (non-native) foods and an increasing reliability on a cash economy. The report concluded that on an historical basis, the annual needs were 19-33 whales.

Nutritional need

The report examined the available alternative food sources, including other marine mammals, birds, fish, and terrestrial mammals, the possible effects on the health of the Eskimo population if a shift in diet to non-native foods occurred, and the food preferences of the Eskimos themselves. The conclusion was that 32-33 whales per year were needed to maintain a proportional share of the subsistence diet in accord with the share in 1969.

Cultural Need

In attempting to quantify the size of any catch required on cultural grounds, it was noted that the wide fluctuations in the historic catch had not changed the Eskimo culture and that indeed they were part of that culture. The culture was based on the opportunity to hunt, to participate in whaling activities, and not just the number of whales landed. It was therefore difficult to calculate a catch on the basis of cultural needs. Nonetheless, after making assumptions that the catch per crew is an important cultural measure of the hunt, that the 1960s provide a base period when cultural needs were met, and that there were good data for three villages and the recent historical catches in the other villages satisfied the needs, it was concluded that 18-22 whales were required to satisfy the cultural needs.

The U.S. stated that the cultural need had the greatest significance to the community, but initially the IWC was unable to agree on a catch limit for 1981 taking account of these needs and the biological evidence. Eventually a compromise was adopted whereby a block quota for the three years 1981-83 was set of 45 whales landed and 65 struck, provided that in any one year the number of whales landed should not exceed 17 (IWC, 1981). The U.S. indicated that the catch would be progressively reduced within these figures during the period.

MANAGEMENT PRINCIPLES AND GUIDELINES FOR ABORIGINAL SUBSISTENCE WHALING

In 1980 the commission noted that the question of aboriginal subsistence whaling was assuming increasing importance in its discussions and agreed that it would be helpful to develop appropriate management principles and guidelines for subsistence catches parallel to those reflected in the commission's management for commercial whaling. It therefore established a Working Group of the Technical Committee, including representatives of that committee, the Scientific Committee, and the indigenous people who take subsistence catches (IWC, 1981). The working group met in 1981 immediately before the annual meeting of the commission, and its report included a number of important concepts (summarized from Donovan, 1982) as follows.

Definitions

Aboriginal subsistence whaling means whaling for purposes of local aboriginal consumption carried out by or on behalf of aboriginal, indigenous, or native peoples who share strong community, familial, social, and cultural ties related to a continuing traditional dependence on whaling and on the use of whales.

Local consumption means the traditional uses of whale products by local aboriginal, indigenous, or native communities in meeting their nutritional, subsistence, and cultural requirements. The term includes trade in items that are by-products of subsistence catches.

Subsistence catches are catches of whales by aboriginal subsistence whaling operations.

Management Principles for Aboriginal Whaling

The following broad objectives were agreed on: to ensure that the risks of extinction to individual stocks are not seriously increased by subsistence whaling; to enable aboriginal people to harvest whales in perpetuity at levels appropriate to their cultural and nutritional requirements, subject to the other objectives; to maintain the status of the whale stocks at or above the level giving the highest net recruitment and to ensure that stocks below that level are moved towards it, so far as the environment permits.

THE IWC MANAGEMENT PROCEDURE FOR ABORIGINAL SUBSISTENCE WHALING

The report mentioned above was forwarded to the member governments of the IWC for consideration and comment during the following year. As a result, at the 1982 annual meeting a resolution was adopted agreeing to implement an aboriginal subsistence whaling regime in order to achieve the objectives set out in the report. It recognized that the full participation and cooperation of the affected aboriginal peoples are essential for effective whale management. A standing sub-committee of the Technical Committee was established to consider documentation on nutritional, subsistence, and cultural needs relating to aboriginal subsistence whaling and the uses of whales taken for such purposes and to provide advice to the Technical Committee for its consideration and determination of appropriate management measures (IWC, 1983).

A proposal on management was developed and adopted as an amendment to the schedule to the convention in the following terms:

(a) Notwithstanding the provisions of paragraph 10 [which sets out the management principles for commercial whaling], catch limits for aboriginal subsistence need for the 1984 whaling season and each whaling season thereafter shall be established in accordance with the following principles:

(1) For stocks at or above the Maximum Sustainable Yield (MSY) level, aboriginal subsistence catches shall be permitted so long as total removals do not exceed 90 per cent of MSY.

(2) For stocks below the MSY level but above a certain minimum level, aboriginal subsistence catches shall be permitted so long as they are set at levels which will allow whale stocks to move to the MSY level.*

(3) The above provisions will be kept under review, based upon the best scientific advice, and by 1990 at the latest the Commission will undertake a comprehensive assessment of the effects of these provisions on whale stocks, and consider modifications.

*The Commission, on advice of the Scientific Committee, shall establish as far as possible (a) a minimum stock level for each stock below which whales shall not be taken, and (b) a rate of increase towards the MSY level for each stock. The Scientific Committee shall advise on a minimum stock level and on a range of rates of increase towards the MSY level under different catch regimes [IWC, 1983:40].

The stocks to which these provisions applied, in addition to the Bering Sea stock of bowhead whales, were humpback whales in Greenland waters, provided that whale catchers of less than 50 gross register tonnage are used for this purpose; gray whales from the eastern stock in the North Pacific; and minke and fin whales from the West Greenland stocks of these species.

These catches are permitted only when the meat and products are used exclusively for local consumption. The Greenland humpback whale provision for whales not below 35 feet (10.7 m) in length was progressively reduced in subsequent years and finally withdrawn altogether in 1985 because of the Scientific Committee's advice that no catch should be permitted from the West Greenland feeding aggregation of about 200-300 animals (IWC, 1986). It should be noted that the U.S.S.R. had overcome high loss rates in its aboriginal fishery by providing a special catcher that replaced aboriginal methods of hunting (IWC, 1978b). This is reflected in the schedule to the convention where the taking of gray whales from the eastern stock in the North Pacific is permitted, but only by aborigines or a contracting government on behalf of aborigines. In 1987 the commission also accepted the aboriginal subsistence nature of humpback whale fishery by the Bequians of St. Vincent and the Grenadines and regularized its status by incorporating a catch limit in the schedule to the convention (IWC, 1988a).

REVIEW OF THE ABORIGINAL SUBSISTENCE WHALING PROCEDURE

In 1983 the Scientific Committee noted that a minimum stock level would be difficult to establish for any individual stock in the present state of knowledge but that it might be possible to advise on a general level below which any stock should not fall. Discussion centred on how such a level might be determined and also the related question of maintenance of adequate genetic diversity necessary for the evolutionary survival of the stock. Important factors for population recovery are the age and sex structure of the population and the degree of density-dependent response. The best indication of the "plasticity" of mysticete populations in terms of their ability to recover from low levels brought about by exploitation by man is the known record. Some stocks appear to be able to increase from levels even below 500 animals, but the level to which other stocks that do not at present show evidence of recovery may have been reduced is unknown. The committee concluded that the consideration of a "minimum level" above which recovery can be assumed or predicted to occur cannot be adequately addressed given the present state of knowledge (IWC, 1984).

The Scientific Committee has given essentially similar expression to its views in succeeding years that the minimum level is unknown, but that even so a population was believed to be above that level or that a current population is above the size of other populations known to be increasing (Donovan, 1991). The Scientific Committee also considered the question of rates of increase in 1983. There is evidence that the Eastern Pacific gray whale has increased at a rate of 3.7% per annum and that right whales off both Argentina and South Africa are increasing at about 7% annually. It proposed that advice to the commission could include information on the probability that net recruitment exceeds $K/(1-f)$ for various values of the kill (K) and the fraction (f) allocated to rebuilding the stock towards MSY (IWC, 1984).

While this appeared to be a useful concept where values of the necessary parameters are available, it has never been applied in practice (Donovan, 1991). However, a range of replacement yields for various MSY rates for bowhead whales based on a simulation exercise has been presented, with the comment that for the population to increase, the catches should be less than the replacement yield (IWC, 1988b, 1989).

In 1990 the Scientific Committee commented that it had not been able to determine minimum stock levels for each stock subject to aboriginal subsistence whaling and has had great difficulty in establishing rates of increase for all but the gray whale and, in recent years, the bowhead whale. It noted the similarity between the management schemes for commercial and aboriginal subsistence whaling, in that they both require estimates of the MSY and the MSY level and rate. The main difference between them is the protection level. It was assumed that any revised procedure for commercial whaling would be generally compatible with that for aboriginal subsistence whaling and that a full discussion of any new scheme for the latter could only usefully take place after an alternative management procedure for commercial whaling had been established (IWC, 1991b).

INTERNATIONAL MANAGEMENT, SOVEREIGNTY, AND NATIONAL LEGISLATION

The United Nations Convention on the Law of the Sea, 1982

The most far-reaching development in recent years with respect to sovereignty and freedom of access in the world's oceans is the United Nations Convention on the Law of the Sea (UNCLOS). The many years of negotiations among governments in that forum meant that there was a continuing delay in taking action on a number of questions raised in the IWC, especially concerning the revision of the 1946 convention and the problems of competence over the species covered by the convention and coastal state jurisdiction. Although the UNCLOS is not yet in force, its provisions have come to be accepted as customary law and normative in most areas of marine affairs.

The United Nations began addressing the issues of over-exploitation of the living resources of the seas in 1967 when the concept of common heritage — the idea that the seas belong to all nations — was first introduced into this international forum, although the context was more specifically the sea bed and ocean floor (Zuleta, 1983). After a long negotiating process, UNCLOS was finally adopted as a package proposal consisting of 320 articles in 17 parts and was signed by 159 states at the conclusion of the third conference in 1982. It will come into force when 60 countries have ratified it.

Of primary significance is the principle of the sovereign rights of coastal states within their 200 nautical mile exclusive economic zone (EEZ) and the objective set out in Article 62 of optimum utilization of the living resources within that zone. All states have a duty to ensure the conservation of the living resources of the sea and to cooperate with other states in so doing. Marine mammals are recognized as one of the species of the living resources to which a special regime applies, and this is reflected in Article 65, which specifically notes that nothing restricts the right of a coastal state or the competence of an international organization, as appropriate, to prohibit, limit, or regulate the exploitation of marine mammals more

strictly than otherwise provided. States are also to cooperate with a view to the conservation of marine mammals and in the case of cetaceans shall in particular work through the appropriate international organizations for their conservation, management, and study.

Particularly relevant here is the fact that there is no recognition in the UNCLOS text of the right of an international organization to infringe on the sovereignty of a coastal state in its exclusive economic zone. It may be noted that the 1946 International Convention for the Regulation of Whaling applies to all waters in which whaling is prosecuted by factory ships, land stations, and whale catchers under the jurisdiction of the contracting governments (Article I, Paragraph 2). There is thus a possible tension between these two treaties in this area.

Some member nations of the IWC with a recent history of commercial whaling, notably Iceland and Norway, have stated in recent meetings of the commission that since that body seems reluctant to allow the resumption of commercial whaling, it might be necessary for them to turn to alternative fora where the issues of catch limits can be discussed (IWC, 1991a). Iceland has subsequently given formal notice of its withdrawal from the convention effective 30 June 1992. In this context the newly established North Atlantic Committee for Cooperation on Research on Marine Mammals, comprising government representatives from the Faroe Islands, Greenland, Iceland, and Norway, is relevant. The UNCLOS text does not specify which international body, or even if there is to be only one body, is the appropriate organization through which coastal states are to cooperate with respect to the management and conservation of the whale resources. Certainly the precedent for regional bodies to oversee the whaling activities of coastal states in particular parts of the world is not new. The governments of Chile, Ecuador, and Peru formed the Permanent Commission of the Conference on the Use and Conservation of the Marine Resources of the South Pacific in 1952. They established catch regulations broadly similar to those in force for the IWC at that time. Subsequently all those governments have joined the IWC — Chile and Peru in 1979, and Ecuador in 1991.

U.S. Legislation

The U.S. has a number of pieces of domestic legislation that have had some influence on the implementation and enforcement of IWC decisions. In particular, the Pelly Amendment of 1971 to the 1965 Fishermen's Protective Act and the 1979 Packwood-Magnuson Amendment to the Fishery Conservation and Management Act of 1976 both require the U.S. Secretary of Commerce to assess if a foreign state is carrying out activities that diminish the effectiveness of an international fishery conservation agreement to which the U.S. is a party, including the 1946 International Convention for the Regulation of Whaling. If that is the determination, then the government is certified under the U.S. legislation, with the result that there is an automatic reduction in the fishery quota of the foreign state in U.S. waters under the Packwood-Magnuson Amendment, and the Pelly Amendment authorizes the imposition of an embargo on the importation of fish products from the foreign state into the U.S. (Birnie, 1985). These legislative instruments have been used, or their use has been threatened, to persuade non-member whaling nations to join the IWC and therefore be bound by IWC decisions. They have also had the effect of encouraging compliance by the affected member nations with

IWC recommendations and resolutions that are essentially of a non-binding nature, such as those dealing with special permit catches of whales for purposes of scientific research under Article VIII of the convention (such special permit catches are exempt from the operations of the convention).

This application of the domestic legislation of one nation to bring about the compliance of other governments with restrictive regulations that the latter would not otherwise accept has caused considerable concern to the affected parties. It has also caused serious diplomatic disputes between the U.S. on the one hand and Iceland, Japan, and Norway on the other directly in the whaling context. Additionally, Mexico has complained that the use of the Pelly Amendment to exclude its tuna from the U.S. market, because of the high incidental catch of dolphins associated with it, is in contravention of the 1947 General Agreement on Tariffs and Trade (GATT). An adjudication on this matter that found in favour of Mexico could have further ramifications in the whole field of ocean resource management.

CONCLUSIONS

In recent years there has been a shift of emphasis in the discussion of the management of the natural resource represented by the whale stocks of the world. When the 1946 convention was formulated and signed the balance of interests among the member states was very much on the side of industrial utilization. Any disagreement on the size of the quotas nearly always was resolved in favour of the whaling industry. Particularly during the past two decades there has been a heightened awareness of the vulnerability of the whales to over-exploitation demonstrated by better scientific understanding and more exact mathematical analysis. There has also been much greater public awareness of the whole question of environmental conservation, in which the whale has come to assume a symbolic as well as an actual leading role. As a result of these changing perceptions of how natural renewable resources should be managed and utilized, the question has been raised of whether or not the 1946 convention should be revised to take account of these new concerns.

So far the convention has been viewed and interpreted as a sufficiently flexible instrument to accommodate the revised approaches to management and protection now current. As an example, the 1982 decision to adopt the moratorium on commercial whaling effective from the 1986 season was taken without regard to the requirement contained in Article V, Paragraph 2, of the convention, which stipulates that such amendments to the schedule should be based on scientific findings and take into consideration the interests of the consumers of the whale products. In the present climate of environmental awareness, the commission is acting in a way that reflects the views of the majority of its members and exercising the so-called "precautionary principle" of management. Under this approach, the burden of proof has been moved to those who wish to utilize the resource to demonstrate that any resumption of whaling will not be harmful. This policy is most likely to prevent a repetition of the successive depletion of one whale species and stock after another, which has been the pattern of the industry over the centuries. It does make it extremely difficult, though, for any nation wishing to resume catching operations on those stocks that are widely recognized to be sufficiently large and capable of sustaining a carefully controlled and monitored harvest.

The first international treaty to provide any sort of regulation and limitation to commercial whaling operations, formulated

in 1931, specifically made exemptions for whaling by aboriginal peoples for their subsistence purposes. The present 1946 International Convention for the Regulation of Whaling contains in its schedule a number of paragraphs that apply specifically to aboriginal subsistence whaling, clearly indicating that this category of activity is identifiably different from the commercial whaling operations. These provisions have been developed and added to over the years as the need arose, and generally in response to specific whale-hunting operations. Thus special provision was made for Greenlanders in 1961 to take humpback whales using vessels of less than 50 tons, even though humpback whaling in the North Atlantic by commercial vessels was prohibited. At the same meeting the season for minke whaling off Greenland was extended from 6 to 8 months, and the use of a land station for treating the whales was not required (IWC, 1962). Then in 1964 an amendment to the schedule was adopted to ensure that gray and right whales could only be taken by aboriginal peoples, or on their behalf, when the meat and products are to be used exclusively for local consumption by those people. This was to avoid abuse of the rights of aborigines by commercial interests (IWC, 1966b).

Subsequently the International Whaling Commission has had to formulate specific management procedures for aboriginal subsistence whaling operations. This arose from the particular case of the Alaskan Eskimo bowhead hunt when the scientific evidence appeared to indicate that that stock of whales was in dire need of total protection from all forms of hunting. As a result of the consultations and meetings that took place, a series of criteria for the regulation and control of aboriginal whale hunts was established. Perhaps the most significant of these was the recognition for the fullest possible participation by the local people affected in the decision-making process and their full involvement in the implementation of the agreed regulations and controls. The current regulations unfortunately request scientific input that is not within our grasp to provide, and the procedure presently followed in practice places the primary determination of catch levels on the perceived subsistence need of the local human populations, with rather little weight attached to the biological capacity of the whale stock to sustain that amount of catch.

The development of revised management procedures for commercial whaling now under way in the IWC may lead to the revision of the procedures for aboriginal subsistence whaling. It would at all events be good for a more practical procedure to be developed that takes account of all the relevant factors, both with respect to the status of the stocks of the whales themselves and to the subsistence needs of the aboriginal hunters and their communities.

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