

INTERNATIONAL MANAGEMENT OF ABORIGINAL SUBSISTENCE WHALING

Ray Gambell

International Whaling Commission

ABSTRACT

The International Convention for the Regulation of Whaling, 1946, continues the special exemption from the regulations designed to regulate commercial whaling which were given to aboriginal whaling in the first international whaling Convention signed in 1931. When the International Whaling Commission established its management procedure for commercial whaling in 1975, it specifically excluded from its scope the whaling operations carried out by aboriginal peoples for subsistence purposes. This development was chiefly the result of the need to accommodate the longstanding Alaskan Eskimo hunt for the bowhead whale, which was then regarded as the most endangered of the whale species. As a result a separate but related management procedure for subsistence whaling operations was developed. This took some account of the status of the whale stocks being harvested, but placed greater weight on the perceived dependence of the native whalers and their communities for the hunt. This need is expressed not just in the nutritional terms of the weight of meat and other products which can be derived from the whale carcasses, but also the part played by the whale hunt and the preparation and distribution of the products in the fabric of the local society. The International Whaling Commission emphasises the importance of involving the indigenous communities in the determination of the local need for such whaling, and in the monitoring and control of the whaling operations at the local level once the international and national regulations have been adopted.

INTRODUCTION

The International Convention for the Regulation of Whaling signed by 15 governments on 2 December 1946 established the International Whaling Commission as the body to implement "a system of international regulation for the whale fisheries to ensure proper and effective conservation and development of whale stocks on the basis of agreed principles" embodied in the provisions of international Agreements signed in 1937 and subsequent protocols adopted in 1938 and 1945 (IWC, 1950). These whaling treaties were all concerned with the commercial whaling operations which were the chief cause of the depletion of whales stocks and thus required regulation and control to provide for the proper conservation of the whale stocks and thus to make possible the orderly development of the whaling industry.

The Schedule forms an integral part of the Convention and the first Schedule included as its second paragraph the following text:

"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).

This exception clause thus carried forward the conceptual approach found in the exception contained in Article 2 of the International Convention for the Regulation of Whaling signed in Geneva in 1931, which was the first attempt to establish international control over the whale fisheries worldwide:

"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)

This exemption was not included in the Whaling Agreement of 1937, which specifically prohibited the taking of right whales, but although the USA 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 & Reeves, (1982). Both Canada and the USA were founder members of the IWC, but Canada withdrew with effect from 30 June 1981

Aboriginal subsistence whaling has therefore been recognised for at least 60 years as in some ways being different from and having a distinctive character which make it susceptible to other controls compared with the larger scale commercial whaling operations. In the 1931 and 1946 agreements which codified the regulations governing the commercial catching activities, aboriginal subsistence whaling was identified only as exempt from the general restrictions and requirements which they spelled out.

However, more precise regulations were implemented by the IWC in 1975 to give total protection from commercial whaling to those stocks which were depleted to less than about half of their original numbers (designated Protection Stocks), and the catches from the more abundant stocks were limited to less than their sustainable yields as determined by the best available scientific evidence in order that the numbers might be stabilised at the optimum level for long-term harvesting (IWC, 1977). This strengthening of the Commission's conservation policy applied initially to commercial whaling operations led on to the recognition of the need for a specific management regime for aboriginal subsistence whale fisheries.

THE BOWHEAD PROBLEM

At the same time as the IWC was developing and putting into place its new management procedure for commercial whaling in the early 1970s, its Scientific Committee was expressing increasing concern over the trend in the catches of the bowhead whale by Alaskan Eskimos. The people of these Arctic communities have a long history and culture based upon the hunting of these whales, but the bowheads were severely depleted in numbers by commercial whaling activities. The commercial fishery 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. 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 (Gambell, 1983).

The catches continued at a modest level of around 12 animals landed each year from 1910 until 1969. During the next eight years there was a significant increase in the catch, averaging 32 animals landed per year to 1977 (Marquette & Bockstoe, 1980). This increase in catch was possibly in reaction to restrictions which had been 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 probably dying from their injuries, increased greatly from 10 in 1973 to 79 in 1977. This change was probably associated with an 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.

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 2,000 animals, and that the kill rate of 5% was increasing. There were also concerns over habitat pollution and degradation from the development of hydrocarbon exploration and extraction activities. The Scientific Committee commented that the reduction of the bowhead whale to a small fraction of its initial population presented serious questions over its ability to survive natural fluctuations which 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 on this species in the hope that this would permit the stock to recover to a somewhat safer level (IWC, 1976b).

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 this species which was recognised to be the most endangered of the whales (IWC, 1978a). This was obviously a very drastic measure, but the evidence presented by the scientists indicated that 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 government of the USA 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 of the bowhead whale to the Eskimo people, and to promote scientific research on the whales and their abundance (Adams, 1982).

Through legal proceedings and persistent lobbying the Eskimo community persuaded the government of the USA to press for a modest take of bowhead whales to satisfy the subsistence and cultural needs of the Alaskan Eskimos. This catch was to be coupled with a scientific programme of research 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 USA on behalf of the Eskimos, since the Scientific Committee continued to urge extreme caution in allowing any catch. Because of the many problems involved in this matter 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, 1979).

In 1979 the Commission convened three panels of experts to help in devising a management programme that would satisfy both the hunters and the very strong conservation lobby. 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 a Technical Committee Working Group which had proposed a dual system of management, involving research and management to be undertaken by the USA and a Schedule amendment which 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 which stated 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, recognising 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 government of the USA based on the following factors:

1. 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,
6. to the extent possible, ecological considerations.

The Commission understood that the USA would adopt a national management plan with the following characteristics:

- (1) it must annually establish a maximum permissible level of whales to be harvested,
- (2) it must establish requirements for the reporting and for the providing of data as mandated by the Schedule,
- (3) it must contain sufficient flexibility to permit quotas to be reduced immediately if, as a result of research and monitoring programs, the United States determines that the level of harvest is preventing the stocks from recovering to the optimum population levels,
- (4) it must contain a provision which allows a lowering of the struck but lost quota if improved hunting efficiency or technology justifies a reduction in the number,
- (5) it must contain a research plan which has the following characteristics:
 - (a) it must be implemented at a sufficient level of effort to produce a reliable estimate of stock size and/or net recruitment rate in five years,
 - (b) it must provide annual calf counts and direct measurements of the size composition of the population throughout its range, if possible,
 - (c) it must monitor trends in abundance of the entire population through direct annual counts using procedures that will provide comparable results between years,
 - (d) it must provide for continuance of research even after the establishment of both net recruitment and population size to assure continued monitoring of the population as long as the stock remains a Protected Stock.

In accordance with this Resolution, the USA presented an interim report to the IWC in 1980 which discussed the historical, cultural and nutritional aspects of the bowhead fishery and attempted to quantify the needs of the Eskimos (summarised by Donovan, 1982).

Historic need

The available catch data by village for the period 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 were 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 between 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. None-the-less, 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 USA 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 USA 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 of the indigenous people who take subsistence catches (IWC, 1981).

The Working Group met in 1981 immediately before the annual meeting of the Commission, and developed the following concepts (as summarised by Donovan, 1982).

Definitions

The Group agreed on three 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 which are by-products of subsistence catches.

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

Involvement of aboriginal peoples

It was recognised that effective management requires the full co-operation of the native peoples concerned and that they therefore should be involved in the decision making process. Although the responsibility for this rests primarily with the involved national governments, considerable advantages were seen in involving them or their representatives at IWC as well as national level.

Management principles for aboriginal whaling

There was some disagreement within the group as to whether it was correct to apply separate management objectives to aboriginal/subsistence whaling and commercial whaling. It was suggested that any whaling activity has its own culture, and is deeply rooted in the history of the nation; as both types of whaling involve the same interaction between man and whales as a resource then the same principles and management objectives should apply.

Others considered that there was a much greater dependence on whale products both for direct subsistence and in a cultural context in aboriginal whaling. In commercial operations the primary reason for continued catches was the sale of products, and not, as in the case of subsistence whaling, to meet nutritional and cultural needs. For this reason the management objectives for the two types of whaling might well be different: in commercial operations the objective is to obtain maximum yields from individual stocks; in aboriginal/subsistence whaling the yield does not need to be maximised provided it is at a sufficient level to satisfy nutritional and cultural needs.

The group recognised that some objectives should be developed which could be applied to aboriginal/subsistence whaling in order to avoid the *ad hoc* consideration of such catches which was the current practice of the Commission. It agreed on the following broad objectives:

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.

Establishing catch limits

The Working Group agreed that for stocks above the level giving the highest net recruitment, catches should not exceed 90% of that net recruitment. However three alternative procedures were proposed to deal with stocks below such a level:

- (i) catches shall be permitted provided the stocks are above protection level (x% of initial stock size) so long as they allow the stocks to move towards the level of highest net recruitment insofar as the environment permits;

- (ii) catches shall be permitted so long as the stock is in no danger of further decline;
- (iii) catches shall be permitted so long as the stock is not declining. If it is, then they should be reduced to zero - either in the shortest possible time or at least until the decline is arrested.

Advice to the Technical Committee

It agreed that these factors should be considered by a separate group who would provide advice to the Technical Committee. A need for the occasional liaison between this group and the Scientific Committee was recognised.

Interactions with commercial catches

The Working Group agreed that as a general approach, important subsistence needs should not be jeopardised by commercial operations, although it recognised that this was not currently a problem. Removals from a population other than catches (e.g. net entanglement) should also be considered.

Data gathering and reporting requirements

The Working Group agreed to the recommendations of the Scientific Committee concerning the need to gather essential basic data on the location, date and time of kill, the species, length, sex, and if female the presence of milk and foetus, and the degree of stomach fill. Extra information on the length and sex of a foetus and the collection and preservation of both ovaries, at least one ear plug, tooth or bulla, a frozen eyeball and a sample of stomach content was also desirable.

Research and monitoring requirements

The Working Group endorsed the recommendations of the Scientific Committee regarding research into the population identity, size, trends and status relative to the initial stock. In addition the Working Group recommended that in the absence of one or more of these essential requirements, safeguards should be applied to the catch limits after consideration of biological, nutritional and cultural requirements although the precise nature of these safeguards was not stated.

Independent observation of subsistence catches

The group agreed in principle that observer schemes similar to those in effect for commercial operations should be developed for aboriginal subsistence whaling operations.

Humane killing

It was agreed that hunting techniques should be made as efficient and humane as possible whilst recognising the essential cultural aspects of the hunt. In addition to the data requirements identified by the Scientific Committee, the group also recommended that to the fullest extent possible information on death times and circumstances surrounding strikes should be provided.

THE IWC MANAGEMENT PROCEDURE FOR ABORIGINAL SUBSISTENCE WHALING

The report outlined 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 recognised that the full participation and co-operation 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 not allow whale stocks to move to the MSY level.*
 - (3) The above proviso 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.

Footnote * 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.

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

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 metres) in length, was progressively reduced in subsequent years and finally withdrawn altogether in 1985 because of the Scientific Committee 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 USSR had overcome high loss rates in their aboriginal fishery by providing a special catcher which 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 regularised its status by incorporating a catch limit in the Schedule to the Convention (IWC, 1988a).

REVIEW OF THE PROCEDURE

Minimum stock level

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 which do not at present show evidence of recovery may have been reduced is unknown. The Committee concluded that the consideration of '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).

Rates of increase

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 comprise 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).

Whilst this appeared to be 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).

The 1990 review

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 , the MSY level and rate. The main difference between them is the protection level. The difficulties associated with the management procedure for commercial whaling have been well documented in the reports of the Scientific Committee, leading to the extensive efforts underway to develop revised procedures. 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, 1991).

CONCLUSION

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 which apply specifically to aboriginal subsistence whaling, and 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).

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, 1966).

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 which 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 present regulations unfortunately request scientific input which is not within our grasp to provide, and place the primary determination of catch levels on the perceived subsistence need of the local human populations, with little or no allowance for 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 (Gambell, 1991) may lead on 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 which takes account of all the relevant factors, both with respect to the status of the stocks of the whales themselves as well as the subsistence needs of the aboriginal hunters and their communities.

REFERENCES

- Adams, J. 1982. History and function of the Alaska Eskimo Whaling Commission, pp. 9-13. In: T.F. Albert, J.J. Kelley and R. Dronenburg (eds.) *Proceedings of the First Conference On the Biology of the Bowhead Whale, Balaena Mysticetus: Population Assessment*. Alaska Eskimo Whaling Commission, Barrow, Alaska, viii+252pp.
- Birnie, P. 1985. *International Regulation of Whaling*. Vol. 1 and 2. Oceana Publications, New York. 1053pp.
- Donovan, G.P. 1982. The International Whaling Commission and aboriginal/subsistence whaling: April 1979 to July 1981. *Rep. int. Whal. Commn* (special issue 4):79-86.
- Donovan, G.P. 1991. Report of the Scientific Committee, Annex H. Aboriginal subsistence whaling management procedures. *Rep. int. Whal. Commn* 41:000-.
- Durham. 1979. The catch of bowhead whales *Balaena mysticetus* by Eskimos, with special emphasis on the Western Arctic. *Contrib. Sci. (LosAngel.)* 314:1-14.
- Gambell, R. 1983. Bowhead Whales and Alaskan Eskimos: a problem of survival. *Polar Record* 21 (no.134):467-73.
- Gambell,R. 1991. The management of whales and whaling (*this meeting*).
- International Whaling Commission. 1962. Chairman's Report of the Thirteenth Meeting. *Rep. int. Whal. Commn* 13:15-24.
- International Whaling Commission. 1966. Chairman's Report of the Sixteenth Meeting. *Rep. int. Whal. Commn* 16:15-22.
- International Whaling Commission. 1977. Chairman's Report of the Twenty-Seventh Meeting. *Rep. int. Whal. Commn* 27:6-15.
- International Whaling Commission. 1978a. Chairman's Report of the Twenty-Ninth Meeting. *Rep. int. Whal. Commn* 28:18-37.
- International Whaling Commission. 1979. Chairman's Report of the Thirtieth Annual Meeting. *Rep. int. Whal. Commn* 29:21-37.
- International Whaling Commission. 1980. Chairman's Report of the Thirty-First Annual Meeting. *Rep. int. Whal. Commn* 30:25-41.
- International Whaling Commission. 1981. Chairman's Report of the Thirty-Second Annual Meeting. *Rep. int. Whal. Commn* 31:17-40.
- International Whaling Commission. 1982. *Aboriginal/Subsistence Whaling (with special reference to the Alaska and Greenland Fisheries)*. Donovan, G.P. (ed.). *Reports of the International Whaling Commission*. (special issue 4). 86pp.
- International Whaling Commission. 1983. Chairman's Report of the Thirty-Fourth Annual Meeting. *Rep. int. Whal. Commn* 34:20-42.

International Whaling Commission. 1984. Report of the Scientific Committee. *Rep. int. Whal Commn* 34:32-181.

International Whaling Commission. 1988a. Chairman's Report of the Thirty-Ninth Annual Meeting. *Rep. int. Whal Commn* 39:10-31.

International Whaling Commission. 1988b. Report of the Scientific Committee. *Rep. int. Whal Commn* 38:32-155.

International Whaling Commission. 1989. Report of the Scientific Committee. *Rep. int. Whal. Commn* 39:33-157.

Marquette, W.M. & Bockstoce, J.R. 1980. Historical Shore-Based Catch of Bowhead Whales in the Bering, Chukchi, and Beaufort Seas. *Mar. Fish. Rev.* 42 (9-10): 5-19.

Mitchell, E.D. and Reeves, R.R. 1982. Factors affecting abundance of bowhead whales, *Balaena mysticetus*, in the eastern Arctic of North America, 1915-1980. *Biol. Conserv.* 22:59-78.