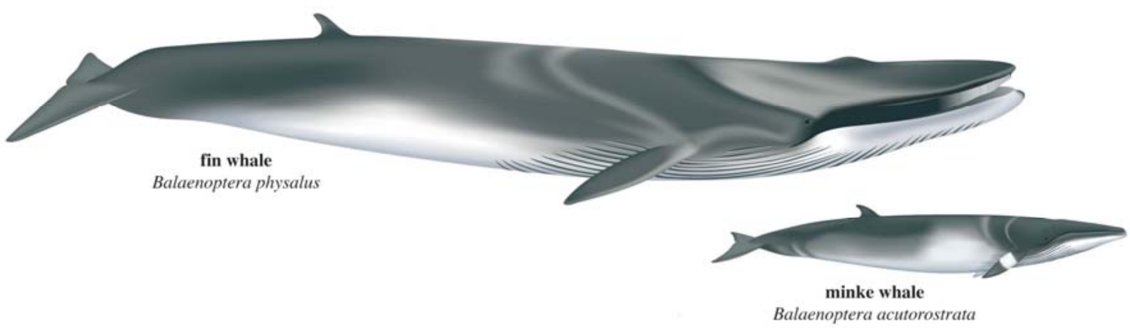
IWC/58/WKM&AWI 8
Agenda item 4.3

# Killing whales under Special Permit: the special case of the fin whale




**Submitted by the Government of New Zealand**

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**Background**

Since the international moratorium on commercial whaling came into effect in 1986[3] more than 6,800 minke whales have been killed in the Antarctic under special permit as part of the Japanese Whale Research Programme. In the 31 years prior to the inception of the moratorium, 840 whales were killed by Japan under special permit.

The Commission has expressed concern, on numerous occasions, about the welfare standards in modern whaling practices, including through 16 Resolutions on whale killing methods. In addition, the Commission has also adopted over 30 resolutions on special permit whaling, in which it has generally expressed the opinion that special permit whaling operations should:

- be terminated, or not commenced, and to limit scientific research to non-lethal methods only (2003-2);
- refrain from killing cetaceans in sanctuaries (1998-4);
- ensure that the recovery of populations is not impeded (1987);
- and take account of the comments of the Scientific Committee (1987).[4]

The most recent resolution on scientific whaling activities in the Antarctic was adopted at the 2005 IWC meeting in Ulsan, Korea. This resolution:

STONGLY URGES the Government of Japan to withdraw its JARPAII proposal or to revise it so that any information needed to meet the stated objectives of the proposal is obtained using non-lethal means.

According to data provided to the Commission, on average, the Instantaneous Death Rate (IDR) for minke whales killed under special permit in the JARPA hunt is approximately half that of whales killed during the Norwegian hunt for minke whales[5]. Weather conditions in the Southern Ocean may play an important role in the efficiency of these hunts. During the 1999 Workshop on Whale Killing Methods, Japan noted that the '*difference between* [the] *proportion of immediate kills for Japanese hunt*[s] *compared to that of Norway could be largely attributed to two main reasons and that it was inappropriate to make comparisons between the two proportions of immediate kills directly. These reasons were:*

1. *different sea and weather conditions*
2. *Japan undertook whaling for scientific purposes*' (IWC 1999).

The impacts of weather on hunting efficiency were further discussed during the 2003 Whale Killing Methods Workshop where van Liere (2003) demonstrated that weather conditions in Area V of the Southern Ocean Sanctuary can be severe[6]. It is also notable that the IDR for whales killed during Japan's North Pacific hunts are also low (Table 1), relative to the IDR reported for minke whales killed during Norwegian hunting activities.

In 2005 Japan announced the expansion of its Antarctic hunt (JARPA II), increasing the number of minke whales killed (rising from 440 +/-10% to 850 +/-10%) and to include two new species; humpback and fin whales. The first two seasons (2005/2006 and 2006/2007) of the JARPA II programme have been designated as a feasibility study, in each of these two seasons 850 +/- 10% Antarctic minke whales and ten fin whales will be killed. The full-scale JARPA II will commence from the 2007/2008 season, in which the number of fin and humpback whales killed each season will increase to 50 for both species (Government of Japan 2005).

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[3] Paragraph 10e of the International Convention for the Regulation of Whaling (see also 10d)

[4] All cited in Resolution 2005-1.

[5] Japan reported IDRs of 43.4% and 45.5% for the 2003/04 and 2004/05 JARPA hunts respectively. For minke whales killed in the North Pacific Japan reported IDRs of 35.0% and 44.0% for the 2003 and 2004 hunts respectively (Ishikawa 2005). The most recent data provided by Norway on IDR, reports an IDR of 80.7% for the 2002 season (Øen 2003 and Anon 2005).

[6] A model to predict the characteristic of a Japanese catcher vessel in Area V suggested that during March 6 sways, averaging 1.2.m, 2 heaves averaging 3.4m and 4 surges of 0.6m could be expected each minute at the level of the harpoon. In December there was a 50% reduction of the sway and surge and an average heave of 1.8m. However, the numbers per minute were doubled compared to March (van Liere 2003).

Using the Instantaneous Death Rate (IDR) from the 2004/2005 JARPA season (Table 1), it is possible to estimate that in the new expanded JARPA II hunt, which involves the killing of up to 935 (850+/- 10%) minke whales, the number of minke whales which could be expected not to be recorded as dying instantaneously would be up to 510 per annum[7] (based on the maximum number of minke whales being taken). If the IDR was lower, as in the 2003/2004 season, the number of minke whales not dying instantaneously in the expanded Antarctic hunt each season could be of the order of 529 animals[8]. Neither of these estimates take into consideration any gunner fatigue over an extended hunting season, nor the introduction of new gunners, (which has in the past been cited as a reason for lower IDRs[9]).

**'Efficiency' and size**

The extent to which low instantaneous death rates for minke whales killed under Special Permit in the Southern Ocean and in the North Pacific is due to poor weather conditions, gunner accuracy, or issues related to sampling methods, will be difficult to quantify unless comprehensive data are provided, including: weather conditions at the time of the kill; the impact site of the harpoon; and struck and lost rates.

However, a relationship appears to exist between the size of the species being killed and the average time it takes these whales to die. Data provided by Japan on whales killed in the JARPA and JARPN II hunts (Table 1) indicate that the size of the species killed (see Annexes I and II) influences the average 'Time to Death' (Figure 1). The data further indicate that the frequency of use of the harpoon as a secondary killing method increases dramatically with the size of the whale species being hunted (Figure 2).

**Table 1.** Data reproduced from most recent report by the Government of Japan to the Whale Killing Methods and Associated Welfare Issues Working Group (Ishikawa 2005)

| **Season** | **Total number Killed** | **Species and hunt** | **Mean TTD** | **Instantaneous Death Rate (IDR)** | **Secondary Killing Method (Number / average shot)** | |
|---|---|---|---|---|---|---|
| | | | | | **Harpoon** | **Rifle** |
| 2003/04 | 440 | Antarctic minke whale JARPA | 2:13 | 43.4 % | 54/1.0 | 213/2.0 |
| 2004/05 | 440 | | 1:58 | 45.5 % | 55/1.0 | 262/1.7 |
| 2003 | 100 | Minke whale JARPN II | 3:14 | 35.0 % | 17/1.0 | 60/2.1 |
| 2004 | 100 | | 1:46 | 44.0 % | 5/1.0 | 51/1.8 |
| 2003 | 50 | Bryde's whale JARPN II | 2:25 | 36.0 % | 11/1.0 | 29/1.9 |
| 2004 | 50 | | 2:09 | 48.0 % | 17/1.0 | 23/1.3 |
| 2003 | 50 | Sei whale JARPN II | 4:34 | 36.0% | 26/1.1 | 22/2.6 |
| 2004 | 100 | | 3:59 | 38.0% | 55/1.1 | 54/2.8 |

[7] 54.5% of 935 minke whales.
[8] 56.6% of 935 minke whales.
[9] Japan reported that 'Three of the gunners doing full-scale work in the 2001/2002 JARPA were new recruits. They took 137 of the 440 whales. TTD and instantaneous death rate of whales taken by the new gunners were, on average worse than that for whales taken by experienced gunners' (Ishikawa 2002).

**Figure 1.** Average 'Time to Death' (TTD) for species currently killed during Japanese Special Permit whaling compared with maximum length for each species (see Table 1)

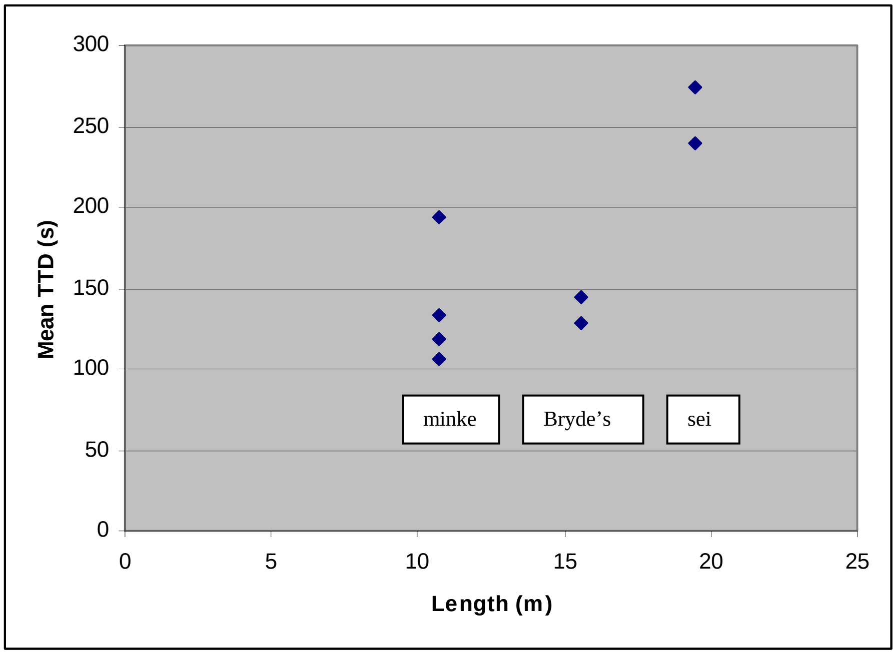
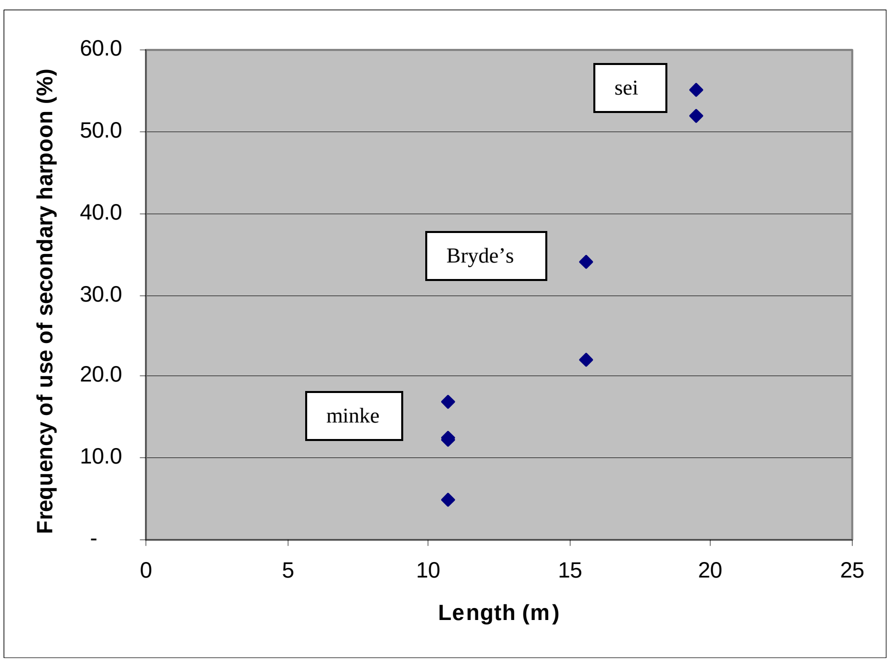



**Figure 2.** Maximum length for each species compared with the frequency of use of a second penthrite harpoon as a secondary killing method during Japanese Special Permit whaling (see Table 1)



**Killing Fin whales: a case study**

The fin whale is the second largest cetacean species, and the second-largest animal ever to have lived on Earth, with a maximum mass of 120 tonnes (Reeves *et al.* 2002). The fin whale is also the largest species of whale currently being hunted. Northern Hemisphere fin whales can reach 24m in length. Southern Hemisphere female fin whales can reach up to 27 m in length (Reeves *et al.* 2002). Annexes I and II provide a comparison of the relative sizes of the species currently, or in the case of the humpback whale, proposed to be, hunted under Special Permit.

In January 2006, a British newspaper reported that a new grenade harpoon had been developed for killing fin and humpback whales during the expanded JARPA II hunt. According to the report "*Japanese whalers are testing a high-tech fragmentation harpoon, equipped with an enlarged charge of high explosive… The explosive harpoons hurl shards of metal through the whale's body to sever major nerves and blood vessels and so cause rapid death*"[10]. The exact specifications of the new device - including the size of the penthrite charge, the strain gauge of the forerunner rope, the mechanism for fragmentation and the method for testing the device - were not provided. It is understood, however, that this media report misinterpreted the modifications to the harpoon and that the only modification to the harpoon used for killing fin whales in the JARPA II hunt is an increased penthrite charge. No information has yet been provided to the Commission on the specification of the harpoon cannon used for firing the fin whale harpoon with the increased penthrite grenade attached.

At the time of writing, no data were yet available on the 'Time to Death' (TTD), 'Instantaneous Death Rate' (IDR), use of secondary killing methods, nor the struck and lost rate for fin whales hunted by Japan during the 2005/2006 JARPAII season. To facilitate independent assessment of the efficacy of killing fin whales in this hunt, it is hoped that these data will be submitted to the 2006 Whale Killing Methods Workshop, along with detailed specification of the increased penthrite charge and any associated modifications to the harpoon cannon.

Data provided by the Greenland Home Rule Government on fin whales killed using the penthrite grenade harpoon provide some insight into the killing of this species (Table 2).

**Table 2** Data reported from Greenland's fin whale hunt

| Year | Number killed | Instantaneous death rate[11] (%) | Average 'time to death' (minutes) | Maximum 'time to death' (minutes) | Number 'struck and lost' | 'Struck and lost' as percentage of total struck (%) |
|---|---|---|---|---|---|---|
| 2000 | 6 | 16.6 | 28 | 60 | 1 | 14.3 |
| 2001 | 7 | 0 | 19min 9s | 45 | 1 | 12.5 |
| 2002 | 13 | 7.7 | 9 | 25 | 0 | 0 |
| 2003 | 9[12] | 11.1 | 114 | 720 | 3 | 25 |
| 2004 | 13[13] | 23.1 | 11 | 26 | 2 | 13.3 |

Note that in the Greenlandic hunt for fin whales the average TTD over the last five years has varied enormously, between 9 and 114 minutes. The maximum time to death varied annually between 25 and 720 minutes[14]. The struck and lost rate in this hunt was between 12 and 25 percent i.e. for every ten fin whales killed and landed, between one and two were struck and lost.

[10] Japan invents super-harpoon to kill whales. J Leake and J Ryall. The Sunday Times. January 29th 2006. http://www.timesonline.co.uk/article/0,,2089-2015111,00.html

[11] Note, where data have only been recorded for a percentage of the whales killed, the IDR and Struck and Lost rates are calculated here from the total number killed.

[12] Note nine whales killed, but data were only recorded for seven whales.

[13] Note thirteen fin whales killed, but data were only recorded for eleven.

[14] Time to Death of 720 minutes was recorded when a whale was temporarily lost after the forerunner broke

If these data from Greenland are similar to those that could be expected during the hunting of fin whales in the Antarctic, mean 'Time to Death' for this species will clearly not be expected to compare favourably with the mean 'Time to Death' for minke whales killed by either Japan or Norway.

Species and weaponry

Low instantaneous death rates and protracted average 'Times to Death' for all species killed under Special Permit indicate that the whale killing methods employed are not well adapted for the range of species killed (Table 1). Moreover, data presented to the Commission show that minke whales, which are by far the smallest species hunted under Special Permit (see Annex I) still take, on average, between one minute 46 seconds and three minutes 14 seconds to die during these hunts.

Several differences between whale species currently hunted under Special Permit are likely to influence the efficiency of killing methods. These include: size and mass; location of external landmarks in relation to internal organs; blubber thickness and specific features of the skeleton (such as the thickness of the skull); and bone density. The characteristics of these tissues may play an important role in the manner in which percussive force is propagated through the body and may influence the impact of these energy waves. For sperm whales, however, there are also more profound anatomical differences, such as the depth at which the brain is located within the head, which will influence the capacity of any weapon to provide a direct and effective strike to the brain[15].

The size diversity amongst the cetacean species, either currently hunted or proposed to be hunted under the expanded JARPA II programme, is best demonstrated by a comparison of maximum mass and length (Annexes I and II). However, other dimensions, such as girth, will also influence the passage of projectiles through the body. These factors, along with the underlying anatomy (also species-specific), play a significant role in the efficiency of a particular killing method. For example, this relates to the depth of penetration of a projectile through the blubber, muscle and bone, relative to the location of vital organs (Anon 2003).

Relevance of blubber thickness and characteristics

A key anatomical characteristic that differs both among and within species is blubber thickness. Blubber can comprise from 15 to 50% of the mass of a great whale, depending on the species, the season, the condition of the animals, and its age (Castellini 2000). Differences in blubber thickness and composition may influence the course of projectiles (grenade harpoons, cold harpoons and bullets) through the body.

Cetacean blubber is a structured material with a significant collagen matrix. Castellini (2000) refers to blubber as a '*dynamic spongy material where the collagen matrix is the structure of the sponge and the lipids move in and out of the matrix based upon metabolic demand*'. Furthermore, Castellini states that upon dissection '*it becomes immediately obvious that cetacean blubber is not homogenous with either depth or position along the body*', and further that '*The lipid content can vary significantly with depth such that the blubber next to the muscle in fin whales (*Balaenoptera physalus*) can have a high protein content while the blubber next to the skin can be very high in lipid*'. Additionally, Castellini suggests, based on observations of the blubber of fin and bowhead whales, that the layering of lipids in the blubber may differ between species.

Clearly, if blubber composition and thickness differs seasonally within an individual whale, as well as between individuals and between species, analysis of the passage of a projectile through this layer needs to be more sophisticated than previously assumed (Anon 2003).

Skull anatomy and bone density

There are considerable structural differences between the skulls of toothed whales and baleen whales (Rommel 1995). Baleen whales have thick, spongy trabecular bones that may be 51-84% fat by weight (Slijper 1979). In contrast, the bones comprising the skull in odontocetes tend to be relatively thin but dense (Hosokawa and Kamiya 1965, Rommel 1990). The differences between species in the density and fat content of the bones of the skull may influence the absorption of mechanical energy and therefore the progress of projectiles.

[15] In New Zealand, in recognition of the problems associated with the humane euthanasia of these large whales, a specific device has been developed for the euthanasia of stranded sperm whales at close range (the SWED – Sperm Whale Euthanasia Device) (Donoghue *et al.* 2003).

Harpoon and grenade specifications

The forerunner rope is used to maintain an attachment between the whale and the vessel and for hauling the whale closer to the boat for landing or in order to administer a secondary killing method. It is essential that the potential strain on the forerunner rope is estimated accurately for the species hunted, in order to reduce the risk of the line breaking and the animal either being 'struck and lost' or having to be secured by a second harpoon (note that the 'line breaking' is often the reported cause of struck and lost whales[16]).

In addition, the trigger mechanism, which causes the barbs to open up as the forerunner is tensioned, to prevent the harpoon from drawing through the whale's body, and the efficiency, strength and size of the barbs, relative to the target animal, could also be expected to have significant impact on: the extent of injury caused; the 'Time to Death'; and the struck and lost rate.

During 1979 Sub-Committee on Humane Killing, it was reported that conventional large whale catching operations involve '*90mm harpoon cannons firing a 60kg, 4 fluked harpoon, armed with a flat-topped, cast iron explosive grenade of approximately 8kg weight, charged with 400gm of black powder*' (IWC 1979).

The IWC 'Bibliography of Whale Killing Techniques' (Mitchell *et al*. 1986) reports that Japanese whalers began using 75 mm cannons firing 45 kg harpoons during the mid-1960s due to a change in emphasis to smaller species and a desire to conserve meat.

In 1951 it was noted that the depth to which a grenade tipped harpoon penetrates the blubber of a whale is a function of its diameter, mass, and velocity (Whale Research Institute 1951). These dimensions, in addition to the use of increased penthrite charges, may still be of significance for the killing of larger species such as the fin whale.

Secondary Killing Methods

Japan noted during the 2005 WKM&AWI Working Group that '*Both Norwegian new grenades (Whale grenade-99) and Japanese penthrite grenades with improved fuses were used for minke whales as the primary killing method. Japanese penthrite grenades with increased powder were used for other species as the primary killing method*' (Ishikawa 2005).

However, the use of underpowered weapons to kill larger whales (sei and Bryde's whales) during the Special Permit hunts conducted by Japan is demonstrated by the frequent use of secondary killing methods and in particular the high mean 'Time to Death' for sei whales: 4 minutes and 34 seconds and 3 minutes and 59 seconds for the 2003 and 2004 JARPNII hunts respectively (Table 1).

During the 2003 and 2004 seasons, a second penthrite harpoon was required for more than 50% of the sei whales killed (Table 1). Despite the frequent use of secondary killing methods, the mean reported 'Time to Death' for this species was still approximately 4 minutes.

One possible cause for protracted times to death in larger whale species (see Figure 1) may be that in some cases the penetration of the harpoon may be insufficient to ensure a swift death. If the grenade explodes at a sub-lethal depth in the body, the injury incurred may be extensive, but the time to death protracted, thus – unless the animal escapes - necessitating the use of a secondary killing method.

Discussion on the secondary killing methods employed in whaling operations have, in recent years, focused primarily on determining the appropriate calibre of rifles for use during minke whale hunts (IWC 1999 and IWC 2003).

However, because these discussions have been primarily limited to minke whale hunts, discussion of the correct calibre of rifle to use in relation to skull thickness, and a variety of other species-specific factors (such as external landmarks), have been neglected for other species. In addition, there has been little debate as to whether a rifle or a second grenade harpoon is the more appropriate secondary killing device for larger species. Japan noted during the

[16] Norway for example, reported that during the 2001 minke whale hunt ten whales were lost because the 'harpoon line broke or the harpoon worked loose' (Øen 2002). Japan however, has not provided any data to the Commission on struck and lost rates during its Special Permit whaling.

2005 WKM&AWI Working Group that '*for sperm whales, only explosive harpoons were used as the secondary killing method*' (Ishikawa 2005).

During the Greenlandic hunt for fin whales, the penthrite grenade harpoon is used as the secondary, as well as the primary, killing method. At the time of writing, no information had been supplied to the Commission regarding the proposed secondary method for killing fin whales in the Antarctic (i.e. a standard penthrite grenade harpoon, a second grenade harpoon with increased penthrite charge, or a rifle).

Japan has, however, indicated in the past that economic factors play a role in the choice of secondary killing method. When commenting on the comparison between the efficiency of the Norwegian penthrite grenade and the Japanese penthrite grenade Ishikawa and Mogoe (2003) noted the relative expense of the Norwegian grenade and commented: "*The financial aspect related to the selection of grenades should be considered carefully as we proceed with research or start future commercial whaling*".

And further:

"*The Norwegian grenade has been shown to be an excellent killing device for minke whales even attached to the Japanese high powered harpoon although some misfiring was observed. Financial concerns may be the most important factor related to the decision whether or not to introduce them to Japan".*

<u>Gunner accuracy</u>

Gunner experience and accuracy is a very important factor in the swift dispatch of hunted whales. Japan reported from the JARPA hunt in the Southern Ocean that the '*instantaneous death rate of whales taken by the new gunners were, on average, worse than that for whales taken by experienced gunners*' (Ishikawa 2002).

The proximity of the vessel and the gunner to the whale is variable and, depending on prevailing conditions, may not be optimal. During whaling operations, the gunner must aim at a moving target, surrounded by a moving sea, from a moving platform.

The Government of Japan (2005) noted, in relation to the taking of two new species under the expanded JARPAII programme, that: '*Crews and research staff of the research fleet have no experience in catching and flensing these two large-sized whales. Thus, it is necessary to examine the practicability of methods of hunting, hauling, flensing and biological sampling*'.

**Discussion**

Taking the fin whale as a specific example for evaluating the welfare of whales hunted under special permit, it should be considered that not only are fin whales the second largest species on the planet, they are also renowned for their swimming speed. Speeds of 20 knots are common, and bursts of up to 25 knots have been recorded (Reeves *et al.* 2002).

Both commercial motivations and research sampling methods may, in part, explain why Special Permit whaling raises even greater welfare concerns than the commercial whaling conducted by Norway. Japanese gunners are instructed not to aim at the head of the whale (Government of Japan 1993) and instead to aim at the thorax, which also facilitates the collection of ear-plugs. Norwegian gunners also target the thorax. Japan has indicated that there are two reasons for the large difference in instantaneous death rate between minke whales killed during Japanese research and those killed during the Norwegian hunt. Firstly, that Japanese whalers cannot '*approach whales unnoticed under its random sampling method*' and secondly, '*the sea areas and conditions differ in that Japan's research is conducted in the open ocean, whereas Norway's hunt is coastal*' (IWC 2005).

Similarly, the desire to preserve meat for commercial sale may influence the choice of secondary killing method, which may be one reason why the rifle is more commonly
used than a second penthrite grenade as a secondary killing method for minke whales in both the commercial Norwegian hunt and Japanese Special Permit hunts. During the 2005 Whale Killing Methods and Associated Welfare Issues Working Group, Japan indicated that a cold harpoon is used as the secondary method for killing minke whales and an explosive harpoon is used as a secondary method for killing larger species (IWC 2005).

Information has not yet been provided on whether gunners will be instructed to aim at the head or the thorax of fin whales. Being a much larger whale, the head will provide a bigger target, while the greater distance between the brain and the thoracic region may influence the ability of an explosion in the thoracic region to render sufficient traumatic brain injury to guarantee immediate insensibility and death, depending on the charge used. Therefore, if the gunners are instructed to aim at the thorax and not the head during fin whale hunting, and if strikes to the thorax do not cause sufficient damage to the vital organs, this may have significant implications for the swiftness of irreversible unconsciousness and death in this species.

Knowles and Butterworth (2006) have recently shown that in order to achieve an immediately immobile and 'presumed' unconscious state in minke whales, using the Norwegian penthrite grenade harpoon, it is necessary to hit a relatively well defined target area. Such accuracy may be difficult to achieve repeatedly, as indicated by the results of research (Knudsen 2004) which showed that the average rate of immediate immobilisation for whales killed by hunters on two vessels in the Norwegian hunt was only 54%.

With the expansion of the JARPA II hunt to include the killing of fin whales, and growing concern that fin whales may become the focus of takes in other areas[17], the efficacy of the methods used to kill these large whales should be carefully scrutinised.

**Conclusion**

There are considerable differences between whale species (and to some degree between individual whales) in terms of mass, length and tissue (bone, muscle and blubber) characteristics. These differences can be expected to influence the efficiency of particular weapons.

Considering their size, the adverse weather conditions which may preclude an accurate strike to the target area and the speed at which fin whales can swim, the instantaneous death rate for fin whales killed during the JARPA II programme in the Antarctic will be the focus of much interest for many delegations. Even with an increased explosive charge, the size and morphology of this much larger species present considerable difficulties for achieving a rapid 'Time To Death' and raises doubts as to whether there could ever be any guarantee that these animals could be killed swiftly.

The data from the Greenland hunt for fin whales, from 2000 to 2004, demonstrate that during this hunt the maximum time to death can be extremely protracted; between 25 and 720 minutes (Table 2). Even with a relatively small sample size, there is frequently at least one whale per season for which death is extremely protracted. Due to the difficulties inherent in killing such a large species, extremely protracted times to death may become a common feature of Special Permit hunts for fin whales (even with the use of increased penthrite charge) and this would present a very significant welfare concern.

The stated objective of the feasibility study of the JARPA II research is:
"*to examine the practicability and appropriateness of sighting methods and sampling procedures, and improve them as necessary. Catches of humpback and fin whales were banned in the Antarctic in 1963 and 1976, respectively. Crews and research staff of the research fleet have no experience in catching and flensing these two large-sized whales. Thus, it is necessary to examine the practicability of methods of hunting, hauling, flensing and biological sampling*" (Government of Japan 2005).

Clearly, one of the main objectives of this feasibility study will be to determine how efficiently fin whales can be killed in the Southern Ocean. Since the present gunners have no experience in killing whales of this size, nor in using the grenade harpoon with increased penthrite charge on live fin whales, the 'experimental' aspect of these kills raises serious concern, particularly as there is no independent oversight.

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[17] The NAMMCO Council requested advice from its Scientific Committee on the long-term effect of the annual removals of 5, 10 and 20 North Atlantic fin whales from Faroese waters. The Scientific Committee noted that in attempting to respond to the request for advice on the long-term effects of various catch levels, it had immediately become apparent that there is insufficient information on stock identity to carry out a reliable assessment of the status of fin whales in Faroese waters, and thus provide reliable advice on the effects of various catches. The Scientific Committee therefore recommended a research programme primarily geared to understanding the stock relationships of fin whales around the Faroe Islands (NAMMCO 2006).

McLachlan (1995) noted that: "*The IWC defines humane killing as causing death without pain, stress or distress perceptible to the animal (IWC 1980). If a harpoon fails in its objective and a secondary killing device has to be used, these criteria cannot be upheld. Despite this, secondary killing should adhere to the IWC definition and ought to render the animal instantly insensible until death occurs*".

More than ten years have passed since this observation was made. Although there is now a voluntary ban on the electric lance, secondary killing methods remain a permanent, and common, feature of all whale killing. In view of their large size, the speed at which fin whales swim and the potentially adverse weather conditions under which these animals may be hunted, it can be expected that, even when struck with a grenade harpoon with increased penthrite charge, the requirement for secondary killing methods may be frequent and the times to death may be protracted for fin whales killed in the expanded Antarctic hunt.

Welfare issues should be a primary consideration in any proposal to kill whales under Special Permit and the humaneness of the kill should be of paramount importance. The International Convention for the Regulation of Whaling (ICRW) empowers the Commission to adopt regulations regarding the weapons used during whaling activities[18]. New Zealand recommends that urgent attention should be given to the use of underpowered weapons to kill large whale species during Special Permit whaling operations.

[18] **Article V of the ICRW states:**
1. The Commission may amend from time to time the provisions of the Schedule by adopting regulations with respect to the conservation and utilization of whale resources, fixing *(a)* protected and unprotected species; *(b)* **open and closed seasons;** *(c)* **open and closed waters**, ………*(d)* **size limits for each species**; *(e)* **time, methods, and intensity of whaling** (including the maximum catch of whales to be
taken in any one season); *(f)* **types and specifications of gear and apparatus and appliances which may be used**; *(g)*…

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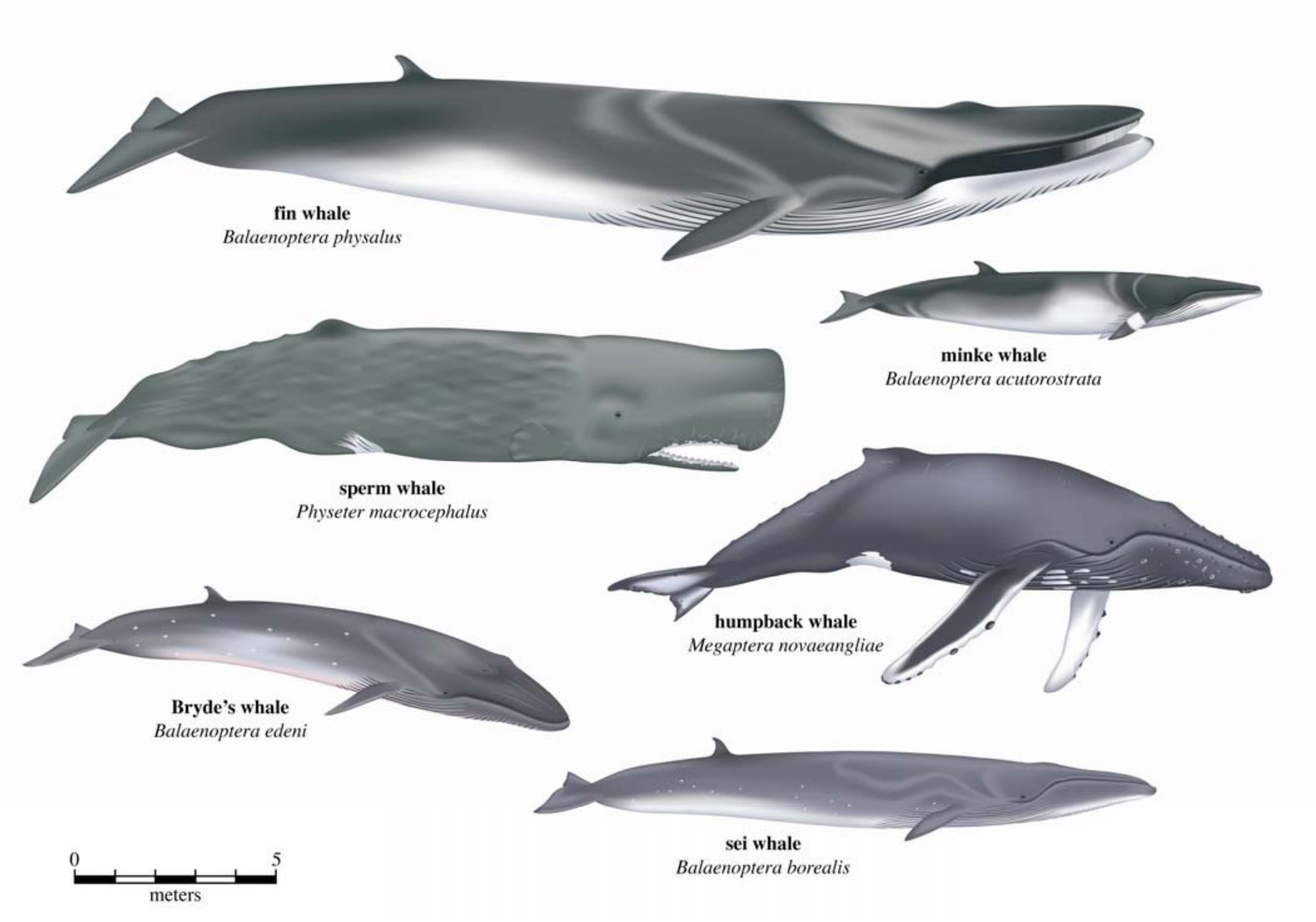
**ANNEX I**
**Comparative size of whales killed (or proposed to be killed) by Japan under 'special permit'**



## ANNEX II

**Maximum mass and length of species hunted, or proposed to be hunted, under special permit**

| **Species** | **Maximum Mass**[19] | **Maximum length**[20] |
|---|---|---|
| Antarctic Minke Whale<br>*Balaenoptera bonaerensis* | Male and female<br>Estimated approx. 9.1 tonnes[21] | Both sexes 10.7m |
| Minke Whale<br>*Balaenoptera acutorostrata* | Male and female<br>10 tonnes | Male 9.8m<br>Female 10.7m |
| Bryde's Whale<br>*Balaenoptera edeni* | Male and Female<br>20 tonnes | 15.6m |
| Sei Whale<br>*Balaenoptera borealis* | Male and Female<br>50 tonnes | 19.5m (male slightly shorter than female) |
| Fin Whale<br>*Balaenoptera physalus* | Male and female<br>120 tonnes[22] | N- hemisphere 24m<br>S-hemisphere 27.1m (male up to 2m shorter than female) |
| Sperm Whale<br>*Physeter macrocephalus* | Male 57 tonnes<br>Female 24 tonnes[23] | Male 18.3m<br>Female >11m |
| Humpback Whale<br>*Megaptera novaeangliae* | Male and Female 65 tonnes | 17m (male slightly smaller than female) |

(Adapted from Anon 2003)

[19]Unless otherwise stated maximum mass obtained from: CRC Handbook of Mammalian Body Masses, Silva M & Downing JA, CRC Press Inc., 1995
[20] Reeves *et al.* 2002
[21] Estimate from: Reeves *et al.* 2002
[22] Reeves *et al.* 2002
[23] Reeves *et al.* 2002