

## PROGRESS ON CONVERSION FACTORS FOR THE GREENLANDIC HUNT

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### INTRODUCTION

Following the report from the Commission's Small Working Group on Conversion Factors for the Greenlandic hunts (IWC/62/9) Greenland was requested to provide information on the amounts of edible products obtained from landed whales. While the reports on this from 2011 to 2013 were welcomed by the Scientific Committee, there is a need for more information due to the relatively slow rate of progress on data collection.

In Greenland it has for long been a legal requirement for hunters to report weight and length measurements for each catch. However, there have previously not been any specifications on how to obtain these weight estimates, and there is also no information on how the traditional weight measurements are estimates. These traditional estimates were therefore considered too uncertain to provide reliable estimates on the amounts of edible products obtained (IWC/62/9), except for the common minke whale where the large amounts of data made it possible to construct reliable conversion factors. IWC/62/9 had therefore recommended that work on the collection of new data be focussed on fin, humpback and bowhead whales, for which provisional conversion factors were established (Table 1).

Table 1. Summarised recommended conversion factors per strike (RCFPS) with the equivalent conversion factors per animal (RCFPA) from IWC/62/9. If the allowance for not reaching the strike limits is not incorporated into the correction factor per strike then the factors would be 1.84 for common minke whales, 9.2 for fin whales and 10.4 for humpbacks.

Species	RCFPA	RCFPS
Common minke whale	1.88	1.82
Fin whale (interim)	10.91	6.8
Bowhead whale (interim)	11.00	11.0
Humpback whale (interim)	11.59	9.5

### HISTORY

To facilitate these new estimates, a new data collection system was introduced in 2010. Hunters were requested to estimate the weight of the bins in which the different edible products were landed, and to count the number of bin landed per whale. Unfortunately the number of weight reports received was low. To improve the data collection process, information meetings involving biologists, hunters, wildlife officers and hunting license coordinators were then held in the larger towns in 2012 and 2013, and an information folder was produced and distributed to the hunters. The data collection process was also combined with an existing research project on hunting samples in order to get a stronger involvement of biologists. When researchers participate in hunts they train the hunters in measuring the lengths (curved and standard) and they make sure that the meat is weighed.

It was also realised that a potential reason for the low reporting rate was the almost complete absence of weighing equipment where the hunters could weigh the different products. To increase the reporting rate, the Greenland Institute of Natural Resources (GINR) purchased and distributed weighing equipment to three of the major towns for the hunters to use when landing a catch. Furthermore, it turned out that the 'bin system' was more complicated than first anticipated because there is a large variation in the size of the bins used within the same hunt and between hunters. It was therefore recommended that hunters weigh all edible products with the crane weight when they land the meat with the crane in the harbour.

## METHODS

In this paper we report all the direct measurements of weights of edible products obtained since the introduction of the bin system in 2010, plus the independent measurements performed on bowhead whales in 2009. These weight measurements include three types of weights: *Total weights*, *Derived weights* and *Distributor weights*.

*Total weight*: The weight and product type of all bins are noted when launched from the boat to the harbour, and the weight of the bins are subtracted from the total weight. So far total weights have only been reported by a GINR representative that has participated in whale flensing.

*Derived weight*: These derived weights consist of hunters weighing up to 10 bins of meat, skin/blubber and ventral grooves and then informing how many of those bins were landed of each type of edible product. For most of these measures we only have one average bin weight and it is unclear how many bins were actually weighed. It is also unclear if the weight of the bin itself is included in the weight.

*Distributor weight*: Total weight as reported by a company in charge of distribution of the products from the whale. This type of distribution has only occurred for three bowhead whales.

## RESULTS AND DISCUSSION

Since the introduction of the sampling protocol in 2009-10, catch reports have been obtained for a total of 68 whales caught in Greenland. These included: 36 humpback whales (9 in 2010, 8 in 2011, 10 in 2012 and 9 in 2013), 25 fin whales (6 in 2010, 5 in 2011, 5 in 2012 and 9 in 2013) and 7 bowhead whales (3 in 2009, 3 in 2010 and 1 in 2011). From these we have received *derived weight* or *total weight* data of edible products from 4 fin whales, 8 humpback whales and 3 bowhead whales (Table 2), and distributor weight for 3 additional bowhead whales.

Bowhead whales have not been taken since 2011, and thus the data presented here for bowhead whales have not changed since the report presented in 2013.

Table 2. Weight (all in kilograms) and length of whales caught in 2009 to May 2013.

Year / id	Sex	Length, m	Meat	Skin / blubber	Ventral grooves	Total	Comment
<b>Bowhead whales</b>							
2009-1	Female	14.1	3,457	3,768	n/a	8,911 <sup>#1</sup>	Distributor weight
2009-2	Female	14.8	4,538	1,856	n/a	8,111 <sup>#2</sup>	Distributor weight
2010-1	Female	14.4			n/a	6,500	Derived weight
2010-2	Female	15.9			n/a	6,500	Derived weight
2010-3	Female	16.1			n/a	12,000	Derived weight
2011-1	Female	16.0	5,950	2,687	n/a	8,637	Distributor weight
<b>Humpback whales</b>							
2010-1	Female	13.2	9,000	4,800	3,000	16,800	Derived weight
2010-7	Female	12.8	4,480	2,160	2,880	9,520	Derived weight
2011-5	Female	12.9	4,010	2,100	2,800	8,910	Derived weight
2011-7	Female	10.1	1,800	3,500	2,000	7,300	Derived weight
2012-10	Na	12.0	1,680	1,500	1,020	4,260	Derived weight
2013-1	Male	11.9	3,976	1,347	1,970	7,293	Total weight
2013-2	Male	11.5	2,400	1,560	1,080	5,040	Derived weight
2013-3	Female	13.1	8,224	1,410	2,753	12,437	Total weight
<b>Fin whales</b>							
2011-2	Female	16.0	2,400	1,120	600	4,120	Derived weight

2011-5	Female	17.0	3,750	2,875	1,875	7,500	Derived weight
2012-4	Female	16.0	5,250	2,100	150	8,280	Derived weight
2013-1	Female	16.1	4,500	1,800	900	7,200	Derived weight

The data in Table 2 give the following average estimates:

*Bowhead whale (Derived weight, n=6):* The average total weight is 8,443 kg (SE:406).

*Humpback whale (Derived weight, n=6):* The average values were meat 3,895 kg (SE:551); skin/blubber 2,603 kg of (SE:259); ventral grooves 2,130 kg (SE:182). This gives an average total weight of 8,638 kg (SE:901).

*Humpback whale (Total weight, n=2):* The average values were meat 6,100 kg (SE:3,004); skin/blubber 1,379 kg (SE:45); ventral grooves 2,1361 kg (SE:554). This gives an average total weight of 9,865 kg (SE:3,637).

*Fin whale (Derived weight, n=4):* The average values were meat 3,975 kg of meat (SE:405); skin and blubber 1,974 kg (SE:242); ventral grooves 881 kg (SE:244). This gives an average total weight of 6,775 kg (SE:609).

All point estimates of edible products are somewhat lower than the provisional estimates from IWC/62/2. Yet, they fit reasonably well with the provisional estimates for humpback whale (within 1SD for both derived and total weight data) and bowhead whale (about 1 SD, Fig. 1). There does not seem to be a large difference between the derived and the *total weight* data for humpback whales. However, the sample size is too low for both categories for a proper comparison.

The derived estimate for fin whale is lower than the interim conversion factor. Owing to the low sample size (n=4) it is unclear whether the lower derived estimate is a true reflection of the average yield for fin whales in Greenland, or whether it is a statistical artifact.

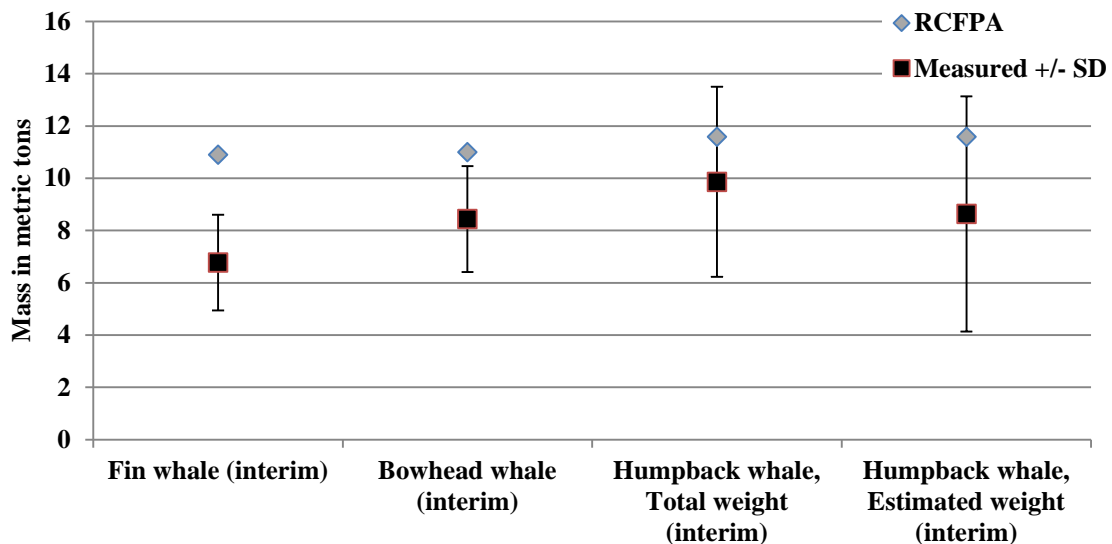


Figure 1. Comparison of measured and recommended conversion factors per animal (RCFPA). Measured mass is shown +/- 1 SD.

## **CURVED VS. STANDARD LENGTH**

As noted in IWC/62/9, prior to 2010, hunters in Greenland have generally taken the curved-linear length of the whale, instead of the standard measurement, which is a straight-line measurement. All the hunters that participated in the information meetings in 2012-13 reported the use of curved length measurement.

Following the Executive Order from 2010, hunters are now instructed to report the standard length, shown with an illustration. During information meetings we reminded the hunters that it is mandatory to report standard length measurements and we encouraged and instructed hunters in how to take the curved and standard measurements.

The GINR research team participated in the flensing, measuring and weighing of a humpback whale in 2013 and were able to obtain standard and curved length measurements of this whale. Later in 2013 GINR arrived to a flensing site of a humpback whale. But the flensing was so advanced that measurement of the length was impossible. In total we have standard and curved length measurements of only 1 minke whale and 1 humpback whale (Table 3).

Table 3. Measurements of curved and standard lengths

<b>Year</b>	<b>Species</b>	<b>Curved length, cm</b>	<b>Standard length, cm</b>	<b>Validated<sup>1</sup></b>
2013	Common minke whale	800	770	No
2013	Humpback whale	1.235	1.185	Yes

<sup>1</sup> Validation is done by a trained wildlife officer or a GINR scientist.

## **CONCLUSION**

The results obtained so far are in reasonable agreement with the provisional conversion factors. However, while both the sampling project and the communication with hunters are steadily improving, the amount of data that we obtain is still disappointing. We will therefore continue with a close contact to fin and humpback whale hunters to improve the weight reports. Hunters have been, and will be, encouraged to report the total weight of each whale. With the new weighing equipment, it is not substantially more time consuming than the bin system, and the data that we obtain are much more reliable. In addition we will continue to train and encourage wildlife officers to perform the validation of the length measurements at the flensing site and to assist the hunters in the weight procedure in the harbour. In the cases where a GINR representative reaches the flensing site in time, they will perform the validation of length and weight measurements.

## **REFERENCES**

- Donovan, G., Palka, D., George, C., Levermann, N., Hammond, P. and Witting, L. 2010. Report of the Small Working Group on Conservation Factors (from Whales to Edible Products) for the Greenlandic Large Whale Hunt. IWC Document IWC/62/9 (IWC/M10/2 rev.)
- Simon, M. and The Ministry of Fisheries, Hunting and Agriculture. 2013. Progress on Conversion factors for the Greenlandic hunt. IWC/SC/65a/AWMP07

# CONVERSIONS FACTORS UPDATED FOR STRUCK AND LOST AND QUOTA FULFILMENT IN THE LAST QUOTA BLOCK 2008-2012

**Addendum to:**

Report of the Small Working Group on Conservation Factors (from Whales to Edible Products) for the Greenlandic Large Whale Hunt, IWC/62/9 Donovan, G et al. 2010



**THE GOVERNMENT OF GREENLAND  
MINISTRY OF FISHERIES, HUNTING & AGRICULTURE  
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# Subsistence whaling needs and recommended conversion factors per animal and per strike

The Kingdom of Denmark has provided information on the aboriginal subsistence whaling needs in Greenland in a number of documents over the years. This document is an update of the recommended interim conversions factors per strike (RCFPS) for struck and lost in the last quota block 2008-2012 following a recommendation of the *Report of the Small Working Group on Conservation Factors (from Whales to Edible Products) for the Greenlandic Large Whale Hunt*, IWC/62/9 Donovan, G et al. 2010 p. 33 and 45: “The importance of the correction factors related to the ratio of landed whales to struck whales and to the catch limits re-emphasises our **recommendations** that the conversion factors are re-evaluated at the end of each block quota using the most recent data for the last five years.”

Estimating the average yield of products per whale and correcting this for actual struck-and-lost animals is done in order to obtain the average yield per strike (i.e. the amount that one could expect to contribute to meeting need, and taking into account that strike limits are not always met).

The yield of meat, blubber and skin from the subsistence hunt of minke, fin, humpback and bowhead whales in Greenland are available from hunters reporting schemes and from work done by the Greenland Institute of Natural Resources involving weighing all products from flensed fin whales, bowhead whales and humpback whales. The weight data (yield) have been presented by the Greenland Institute of Natural Resources to the Scientific Committee; hence it will not be part of this document.

Based on the work in IWC/62/9 the average yield of meat and other edible products in tonnes per whale (agreed RCFPA: conversion factors per animal) are for minke whale 1.88 (2.766 whales), for fin whale 10.91 (271 whales), for bowhead whale 11.0 (3 whales) and for humpback whales 11.59. The data had outliers in both ends, but corresponded well with the already adopted conversion factors for meat and other edible products of respectively 2 and 10 tonnes for minke whale and fin whale.

As the objective of the study was to provide information and determine conversion factors relevant to likely yield to be obtained given certain strike limits, the correction for struck-and-lost animals used in the report followed the approach of Witting (SC/61/AMMP8), i.e. it also incorporated information on whether the strike limits had been able to be met in recent years. This is primarily relevant to the case of the fin whale and bowhead whale for which the strike limit was not always met. Thus the correction factor used in the report and our document takes into account both of these factors (actual struck-and-lost and fulfillment of strike limit) for the period 2008-2012.

In the most recent five year strike limit period (2008-2012), the average proportion of landed animals relative to all struck animals (landed plus lost animals) is 0.82 for minke whales, 0.49 for fin whales, 0.50 for bowhead whales and 0.86 for humpback whales (Greenlandic data), taking fulfillment of quota into account. If instead it is assumed that the strike limit is always reached, then the correction for struck-and-lost animals (the simple ratio of animals struck to those landed) for all species except humpback whales would be lower, i.e. 0.96 for minke whales, 0.83 for fin whales, 1.00 for bowhead whales and 0.89 for humpback whales; the reason for the correction for humpback whales remaining effectively unchanged is because of the full quota utilisation.

The correction corresponds to 1.5 tonnes of products per minke whale strike, 5.3 tonnes per fin whale strike, 5.5 tonnes per bowhead whale, and 9.9 tonnes per humpback whale strike, summarized in table 1 and table 2. These numbers are lower for fin whale and bowhead whale because of a lower fulfilment of the strike limit in the last quota block. For the previous quota block 2003-2007 see table 2.

Using the adopted conversions factors and actual use of the whales per given strike limit based on average number of landed whales in the last quota block 2008-2012 it is shown in table 3 that 193 tonnes less is actually landed, giving the difference between the potential yield of 654 tonnes and the actual yield of 461 tonnes.

**Table 1. In the most recent five year strike limit period (2008-2012), the average proportion of landed animals relative to all struck animals (landed plus lost animals) and incorporating information on whether the strike limits had been able to be met**

Species	2008				2009				2010				2011				2012				Proportion landed/stuck	Proportion landed/strike limit
	Landed animals	Struck and lost animals	Struck animals	Quota	Landed animals	Struck and lost animals	Struck animals	Quota	Landed animals	Struck and lost animals	Struck animals	Quota	Landed animals	Struck and lost animals	Struck animals	Quota	Landed animals	Struck and lost animals	Struck animals	Quota		
Minke whale	146	5	151	200	153	11	164	215	180	7	187	193	173	6	179	185	144	4	148	183	0,96	0,82
Fin whale	11	3	14	19	8	2	10	19	5	1	6	10	5	0	5	10	4	1	5	10	0,83	0,49
Bowhead whale	0		0	2	3	0	3	4	3	0	3	3	1	0	1	2	0		0	3	1,00	0,50
Humpback whale	0		0	0	0		0	0	9	0	9	9	8	0	8	9	7	3	10	10	0,89	0,86



<b>Table 2. The recommended conversion factors per strike (A) RCFPS - quota block 2003-2007 recommended in IWC/62/9 of 2010 and (B) RCFPS - quota block 2008-2012. In addition the equivalent conversion factors per animal (RCFPA), as well as the original conversion factors (per animal and calculated per strike on the basis of the struck-and-lost rates given in the 2010 report – OCFPA and OCFPS). NG = not previously given.</b>					
Species	OCFPA	OCFPS	RCFPA	RCFPS (A) (quota block 2003-2007)	RCFPS (B) (quota block 2008-2012)
Minke whale	2.00	1.96	1.88	1.82	1.53
Fin whale	10.0	6.6	10.91	6.8	5.29
Bowhead whale	NG	NG	11.0	11.0	5.5
Humpback whale	NG	NG	11.59	9.5	9.9

<b>Table 3. Information on tonnes of products to be expected on average for catch limits using the conversion factors per animal (RCFPA), the conversion factors per strike (A) RCFPS - quota block 2003-2007 recommended in IWC/62/9 of 2010 and (B) RCFPS - quota block 2008-2012 for those limits that were in accord with the Scientific Committees advice in its report 2012 based upon the request by Denmark. Yield in tonnes</b>				
Species	Strike limits within SC advice on sustainability	Potential total yield based on RCFPA*	Products for (A), actual yield#	Products for (B), actual yield $\alpha$
Minke whale	164	308	298	251
Fin whale	19	207	129	101
Bowhead whale	2	22	22	11
Humpback whale	10	116	95	99
<b>Total yield</b>	<b>195</b>	<b>654</b>	<b>545</b>	<b>461</b>

\* Using adopted conversions factors for meat and other edible products of respectively 1.9, 10.9, 11.0 and 11.6 tonnes.

# Using adopted conversions factors and actual use for minke whale of 98 %, for fin whale of 66 %, for humpback an estimated 82 % and for bowhead 100 % per given strike limit based on average number of landed whales in the previous quota block 2003-2007.

$\alpha$  Using adopted conversions factors and actual use for minke whale of 82 %, for fin whale of 49 %, for humpback 86 % and for bowhead 50 % per given strike limit based on average number of landed whales in the last quota block 2008-2012.

## References

Donovan, G., Palka, D., George, C., Levermann, N., Hammond, P. and Witting, L. 2010. Report of the Small Working Group on Conservation Factors (from Whales to Edible Products) for the Greenlandic Large Whale Hunt. IWC Document IWC/62/9 (IWC/M10/2 rev.)

Witting 2009 SC/61/AWMP8