Report of the Scientific Committee

Bled, Slovenia, 7-19 June 2016

Annex S: Draft Tables of 'Accepted' Abundance Estimates (to be revised intersessionally)

**This report is presented as it was at SC/66b.
There may be further editorial changes (e.g. updated references, tables, figures)
made before publication.**

International Whaling Commission

Bled, Slovenia, 2016

Annex S

Draft Tables of 'Accepted' Abundance Estimates

(to be revised intersessionally)

These tables of 'Accepted' Abundance Estimates aim (i) to collate information in a consistent way on abundance estimates accepted by the Scientific Committee for various purposes and (ii) to provide a simplified table of abundance estimates suitable as a broad overview for the Commission and the public. For further information about the objectives of these tables see IWC 2014 (JCRM 15 suppl., p416-7).

i) Accepted abundance estimates for Scientific Committee use

The aim is to provide information consistently in a single table to represent an initial summary of the Committee's current set of 'accepted' abundance estimates. Work will be required to examine the comments and commonalities in order make the tables more consistent.

ii) Broad overview estimates for the Commission and general public

IWC 2014 envisaged the broad overview estimates as a separate table. They are included here in the same tables as i) but shown as being either on, or recommended for inclusion on, the IWC website. The advantage of including them in the same table for immediate checking purposes is to show the source of estimates which are combinations of smaller areas.

Estimates for disjoint areas should be summed if they were from the same year or years close together in time. These combined estimates are highlighted in green. Approximate 95% confidence intervals for summed estimates are calculated from the CVs of the estimates and assuming a log-normal error distribution. In the interests of simplicity and a common approach, any additional variance estimate (available in only some cases) be ignored for this purpose.

Only the most recent estimates for a species and ocean basin should be given for the broad overview. Information on trend should be considered as an additional step to be pursued in the future, recognising the need for more consideration inter alia of information from modelling exercises.

The tables include notes showing early values of the estimates which are later updated (or corrected) to document the source of any different values.

The key to the table columns is given below.

Heading	Contents
Ocean Basin	
Species	Use IWC list
Population	This will depend on whether the sub-group has assigned populations/sub-stocks.
Area	If *Areas* are identified in an RMP context these should be used. Otherwise use broad categories (eg Schedule management areas) and indicate whether total or partial coverage
Category	As described below. In each case if not clear add an asterisk to indicate that the estimate needs to be considered further. Use either: (1) acceptable for use in in-depth assessments or for providing management advice; (2) underestimate - suitable for 'conservative' management but not reflective of total abundance; (3) while not acceptable for use in (1) or (2), adequate to provide a general indication of abundance. Provisional estimates have been included as Category (3).
Evaluation extent	Degree to which the estimate was considered originally by the sub-committee concerned: use (1) estimate was examined in detail by the sub-committee; (2) estimate was partially examined by the sub-committee but method standard; (3) degree to which the estimate was considered by the sub-committee is unclear but method standard; (4) estimate was partially considered by the sub-committee partially and a new method was used; (5) degree to which the estimate was considered by the sub-committee is unclear and a new method was used.
RMP Status	Status in RMP trials. Use: I' agreed to be suitable for use in an actual *CLA* calculation to produce a catch limit 'C' used in the trial conditioning as an absolute estimate of abundance 'C_{min}': used in the trial conditioning a minimum estimate of abundance 'CP': provisional estimate suitable for use in conditioning but further analysis needs to be considered before use in an actual *CLA* calculation. T' used in RMP trials but further analysis needs to be considered before use in an actual *CLA* calculation.
Date stamp	The year to which estimate applies. This will normally be the year of the survey unless the estimate is based on multiple years or a population assessment model (Note: Consideration needs to be given as to whether estimates from such models are acceptable for this table, in contrast to, for example, mark-recapture based estimates which do require model-processing.)
Range of years	The years concerned when estimate applies to surveys over a number of years

Method	Indicate method. LT: line transect (or distance-sampling); MR: mark-recapture; SM: spatial modelling; PA: population assessment (see question raised above); 1+; LT+SM: distance-sampling with spatial modelling; CC: Cue counting; PID: PhotoID of individuals; GMR: Genetic mark recapture.
Correction	Where applicable, indicate if the estimate is corrected for A: availability (corrects for the time the whales are available at the surface); P: perception bias (corrects for missed sightings); A+P: availability & perception bias; or adjustment for g(0) < 1 applied Note. Care should be taken regarding the interpretation of g(0) because the distinction between availability and detection bias for ship-board surveys is somewhat arbitrary and dependent on the exact analysis method employed.
Estimate	Estimate of 1+ abundance unless otherwise indicated
CV	CV of estimate from survey sampling error only
CV (AV)	CV with Additional Variance component arising from annual distributional changes added
95% CI	Approximate 95% confidence intervals (or equivalent) rounded to three significant figures of upper limit
IWC reference	The reference to where the estimate was discussed in the Scientific Committee
Original reference	The reference of the analysis presented originally
Comments	Brief comments on survey and any difficulties encountered
Program	Survey program/organiser
On Web?	Is estimate listed on the IWC website? Y: yes R: recommended for inclusion

Note: greyed out rows show other estimates which have not been discussed by the Scientific Committee. These estimates may be discussed in future. At present they are incomplete.

North Atlantic Minke whales

Sub-area	Cat.	Eval. Ext.	RMP Status	Range of years	Method	Corr.	Estimate	CV	Approx. 95% CI	Reference	Notes	On Web?
EB	1	1	CI	1989	LT	A+P	21,868	0.21	14600-32700	Bothum and Øien, 2011; IWC 2011 p95		
EN	1	1	CI	1989	LT	A+P	8,318	0.25	5100-13700	Bothum and Øien, 2011; IWC 2011 p95		
ES	1	1	CI	1989	LT	A+P	13,070	0.13	10100-16900	Bothum and Øien, 2011; IWC 2011 p95		
EW	1	1	CI	1989	LT	A+P	20,991	0.17	15100-29200	Bothum and Øien, 2011; IWC 2011 p95		
E				1989			**64,247**	**0.10**	**52900-78000**		**Combined area estimate ~ 64,000**	**Y**
E				1989			**64,730**	**0.19**	**44400-94300**	**Schweder et al, 1997**	**See $$ for explanation of difference**	
EB	1	1	CI	1995	LT	A+P	29,712	0.18	20800-42400	Bothum and Øien, 2011; IWC 2011 p95		
EN	1	1	CI	1995	LT	A+P	22,536	0.23	14300-35600	Bothum and Øien, 2011; IWC 2011 p95		
ES	1	1	CI	1995	LT	A+P	24,891	0.10	20600-30000	Bothum and Øien, 2011; IWC 2011 p95		
EW	1	1	CI	1995	LT	A+P	34,986	0.12	27900-43900	Bothum and Øien, 2011; IWC 2011 p95		
E				1995			**112,125**	**0.08**	**96000-130900**		**Combined area estimate ~ 112,000**	**Y**
EW	1	1	CI	1996	LT	A+P	23,522	0.13	18300-30200	Bothum and Øien, 2011; IWC 2011 p95		
EN	1	1	CI	1998	LT	A+P	13,673	0.25	8300-22500	Bothum and Øien, 2011; IWC 2011 p95		
ES	1	1	CI	1999	LT	A+P	17,406	0.14	13200-22900	Bothum and Øien, 2011; IWC 2011 p95		
EB	1	1	CI	2000	LT	A+P	25,885	0.24	16200-41500	Bothum and Øien, 2011; IWC 2011 p95		
E				96-00			**80,486**	**0.10**	**66000-98100**		**Combined area estimate ~ 80,000**	**Y**
ES	1	1	CI	2003	LT	A+P	19,377	0.28	11300-33200	Bothum and Øien, 2011; IWC 2011 p95	CV = 0.33 in Bothum et al, 2009: see *	
EN	1	1	CI	2004	LT	A+P	6,246	0.47	2500-15600	Bothum and Øien, 2011; IWC 2011 p95	CV = 0.48 in Bothum et al, 2009: see *	
EW	1	1	CI	2006	LT	A+P	27,152	0.128	17700-41600	Bothum et al, 2009; Bothum and Øien 2011; IWC 2011 p95		
EB	1	1	CI	2007	LT	A+P	28,625	0.23	18100-45300	Bothum and Øien, 2011; IWC 2011 p95	CV = 0.26 in Bothum et al, 2009: see *	
E				2003-7			**81,400**	**0.13**	**62700-105600**		**Combined area estimate ~ 81,000**	**Y**
ES	1	1	CI	2008	LT	A+P	27,390	0.29	15500-48400	Solvang e*t al*, 2015		
EN	1	1	CI	2009	LT	A+P	6,891	0.31	3800-12700	Solvang e*t al*, 2015		
EW	1	1	CI	2011	LT	A+P	21,218	0.32	11300-39700	Solvang e*t al*, 2015		
EB	1	1	CI	2013	LT	A+P	34,125	0.34	17500-66400	Solvang e*t al*, 2015		
E				2008-13			**89,624**	**0.18**	**63500-126500**		**Combined area estimate ~ 90,000**	**Y**
CM	1	1	CI	1988	LT		4,732	0.23	3000-7400	IWC 2009 p135.	Combination of estimates for 1987: 5,609, cv 0.26 (Øien 2000) and 1988-9: 2650, cv 0.48 (Schweder et al 1997, no NVS). See IWC 2009 p135.	
CM	2	1	**No**	1995	LT		[6,174]	0.36	-	Bothum and Øien, 2011 & IWC 2009 p135 from Schweder et al 1997.	No NVS. The 12,043 estimate had better areal coverage	
CM	1	1	CI	1995	LT		12,043	0.28	7000-20800	IWC 2009 p135 from Borchers et al 1998	Combined Norway and Iceland	
CM	1	1	CI	1997	LT	A+P	26,718	0.14	20300-35200	Bothum and Øien, 2011. IWC 2009 p135 from Skaug et al 2004.		
CM	1	1	CI	2005	LT	A+P	26,739	0.39	12500-57400	Bothum and Øien, 2011; Bothum et al, 2009.	Update to 24,890, cv 0.45, in IWC 2009 p135	
CM	3		CI	2010	LT	A+P	10,991	0.36	5400-22300	Solvang e*t al*, 2015		
CIC	1	1	CI	1987	LT	A+P	24,532	0.32	13000-46300	IWC 2009 p135; Borchers et al 2009		
CIC	2		**No**	1995	LT	A+P				Not estimated. Borchers et al 1997		
CIC	1	1	CI	2001	LT	A+P	43,633	0.19	30100-63300	IWC 2009 p135; Borchers et al 2009		
CIC	1	1	CI	2007	LT	A+P	20,834	0.35	10500-41400	IWC 2015 p117-9; Pike et al 2011.	Replaces 10,680 (0.29) agreed IWC 2009 p135-7	
CIC	1	1	CI	2009	LT	A+P	9,588	0.24	6000-15300	IWC 2015 p117-9; Pike et al 2011		
CIC	1	1	I	2015	LT	A+P	12,710	0.53	4,498-35,912	SC/66b/RMP02	g(0) = 0.51	
CIP	1	1	CI	1987-9	LT	-	8,431	0.245	5200-13600	IWC 1993 p66,128-9	Used as a minimum estimate: no g(0) correction	
CIP	1	1	CI	2001	LT	-	3,391	0.82	700-16900	Gunnlaugsson et al 2003	Used as a minimum estimate: no g(0) correction. See ‡	
CIP	1	1	CI	2007	LT	-	1,350	0.38	600-2800	SC2009 (TNASS), IWC 2011 p95		
CG	1	1	CI	1987	LT	-	1,555	0.26	900-2600	IWC 1993 p66,128-9	Used as a minimum estimate: no g(0) correction	

Sub-area	Cat.	Eval. Ext.	RMP Status	Range of years	Method	Corr.	Estimate	CV	Approx. 95% CI	Reference	Notes	On Web?
CG+CIP	1	1	CI	1995	LT	-	4,854	0.27	2900-8200	Pike et al 2002	Used as a minimum estimate: no g(0) correction	
CG	1	1	CI	2001	LT	-	7,349	0.31	4000-13500	Gunnlaugsson et al 2003	Blocks Bx and Wx. Used as a minimum estimate: no g(0) correction. See ‡	
CG	1	1	CI	2007	LT	-	1,048	0.60	300-3400	SC2009 (TNASS), IWC 2011 p95		
C				2005-7			**49,971**	**0.26**	**30300-82390**		**Combined area estimate ~ 50,000**	**Y**
Icelandic + Faroese survey blocks	1	1	I	2015	LT	A+P	36185	0.31	19,942-65,658	SC/66b/RMP02	Includes CIC subarea. g(0) = 0.51	
WG	2	1	C_{min}	1987-8	LT		3,266	0.31	1800-6000	IWC 2009 p135; IWC 1990 p43	Partial coverage of area	
WG	2		C_{min}	1993	LT	A	8,371	0.43	3600-19400	IWC 2009 p135; Larsen, 1995	Known not to cover all of population. Reanalysed by Hedley et al 1997: 6,385, cv 0.411 [or 6,342, cv 0.35 in IWC 2009 p135]	
WG	2		C_{min}	2005	LT	A+P	10,792	0.59	3,600-32,400	IWC, 2008 p126. Heide-Jørgensen et al.,2008	Known not to cover all of population	
WG	2		C_{min}	2007	LT	A+P	16,609	0.428	7,200-38,500	IWC, 2012 p130. Heide-Jørgensen et al.,2010.	Known not to cover all of population. See IWC 2010 p138-9 for discussion of method (17,307 estimate was rev. for publication)	**Y**
WC			C	2007	LT	A+P	20,741	0.30	11500-37300	Lawson and Gosselin 2009 (ref NOAA 2015)	From NASS2007	

See also IWC 2009 p135 for 3 other WC estimates for parts of the area.

* Bothum & Oien, 2011, recalculated the 1989 and 1995 estimates and associated cvs for the revised sub-areas; the cv's for the 2003-7 period were also recalculated using the same method: they differ from those in Bøthun et al. 2009 which were calculated using a simulation approach. The Bothum & Oien 2011 cvs are used here as they are comparable with those from earlier years.

‡ JCRM 11 (suppl) 2009 p135 shows a combined estimate for CG+CIP in 2001 as 23,592. This should be 10,740 (=3,391+7,349)

$$ These estimates are taken from Schweder et al. (1997) and are different from the results from direct application of area proration. The differences are caused by a very small part of the 1989 survey block (SN) falling within the CM Small Area in the area projection used here.

North Atlantic Fin whales

Sub-area	Cat.	Eval. Ext.	RMP Status	Date stamp	Range of years	Method	Corr.	Estimate	CV	Approx. 95% CI	Reference**	Notes	On web?
EC					1965-72	MR		10,818	0.36	5340-21900	IWC 1992 p600; Cooke 1992		
(EC)	-	-	-	1999	1999			2,814	0.21	1860-4240	Wade 2009	Georges Bank to mouth of Gulf of St. Lawrence	
(EC)	-	-	-	2002	2002			2,933	0.49	1120-7660	Wade 2009	S. Gulf of Maine to Maine	
(EC)	-	-	-	2004	2004			1,925	0.55	650-5650	Wade 2009	Gulf of Maine to lower Bay of Fundy	
(EC)	-	-	C	2006	2006			2,269	0.37	1090-4680	Wade 2009; IWC 2009 p12; Waring et al 2007	S.Gulf of Maine - upper Bay of Fundy - Gulf of St. Lawrence	
(EC)	-	-	-	2007	2007							US waters	
EC	3		C	2003	2003			10,105	0.4	4610-22130	Lawson 2006	Lawson's estimate for Newfoundland waters is used. However NOAA reports list 3,522, CV=0.27 for this survey	
WG			C	1988	1987/8	CC		1,096	0.35	560-2,130	IWC 1992 p606; IWC 1993 p75	Revised from IWC 1992 p70-1,200 and Hiby et al 1989 to use revised blow rate estimate	
WG	1	1	I,C	2005	2005	LT	P	3,234	0.44	1,400-7,400	Heide-Jørgensen et al 2008; IWC 2008 p125-6; IWC 2009 p12	Revised from preliminary value of 3,218 cv 0.43 in Heide-Jørgensen et al 2007 & IWC 2008 p125-6. Potential -ve bias as no adjustment for availability bias.	
WG	1	1	I,C	2007	2007	LT		4,359	0.45	1,900-10,100	Heide-Jørgensen et al 2010; IWC 2010 p23-4	Negatively biased (no correction for whales submerged during passage of the survey plane). See IWC 2009 p22 for status	

Sub-area	Cat.	Eval. Ext.	RMP Status	Date stamp	Range of years	Method	Corr.	Estimate	CV	Approx. 95% CI	Reference**	Notes	On web?
EG+WI+EI/F				1988	1987-9			14,773	0.14	11170-19520		Combined area estimate ~ 15,000	Y
EG+WI+EI/F				1995	1995			21,859	0.16	16070-29710		Combined area estimate ~ 22,000	Y
EG+WI+EI/F				2001	2001			25,761	0.13	20140-32930		Combined area estimate ~ 26,000	Y
EG+WI+EI/F				2007	2007			21,946	0.15	16400-29350		Combined area estimate ~ 22,000	Y
EG+WI+EI/F	1		I	2015	2015			40,788	0.17	28,476-58,423	SC/66b/RMP01	Estimate for Icelandic & Faroese survey blocks. g(0) = 0.86	
EG	1	1	I,C	1988	1987-9	LT		5,269	0.221	3410-8120	Pike & Gunnlaugsson 2006; Buckland et al 1992a; Wade 2009	Weighted average of 1987 & 1989 B-West estimates (1750 & 2329) + 1989 estimate for A-West = 1995 + 3274	
EG	1	1	I,C	1995	1995	LT		8,412	0.288	4780-14790	Pike & Gunnlaugsson 2006	Sum of A-West (very low coverage) and B-West = 600 + 7812	
EG	1	1	I,C	2001	2001	LT		11,706	0.194	8000-17120	Pike & Gunnlaugsson 2006	Sum of A-West and B-West = 3970 + 7736	
EG	1	1	I,C	2007	2007	LT		12,215	0.2	8250-18070	Pike et al 2008		
WI	1	1	I,C	1988	1988	LT		4,243	0.229	2700-6640	Pike & Gunnlaugsson 2006; Buckland et al 1992a; Wade 2009	Weighted average of 1987 & 1989 B-East estimates (1857 & 3677) + 1989 estimate for A-East = 2648 + 1595	
WI	1	1	I,C	1995	1995	LT		6,800	0.218	4430-10420	Pike & Gunnlaugsson 2006	Sum of A-East (very low coverage) and B-East = 885 + 5915	
WI	1	1	I,C	2001	2001	LT		6,565	0.194	4480-9600	Pike & Gunnlaugsson 2006	Sum of A-East and B-East = 280 + 6285	
WI	1	1	I,C	2007	2007	LT		8,118	0.26	4870-13510	Pike et al 2008		
EI/F	1	1	I,C	1988	1987/8	LT		5,261	0.277	3050-9050	Christensen et al 1992, Øien 1990, Pike & Gunnlaugsson 2006, Wade 2009	Sum of Norwegian survey blocks W of 0° + NASS EGI & WN-SPB blocks = (5806+1265)/2 + 1050 + 675. The former is an average for 1987 & 1988.	
EI/F			-	1989	1989						Christensen et al 1992	Not used: survey did not go N of Iceland	
EI/F	1	1	I,C	1995	1995	LT		6,647	0.288	3770-11680	Øien 2003, Pike & Gunnlaugsson 2006, Wade 2009	Sum of EGI + WN-SPB (NASS) and NVN + JMC (Øien) blocks = 4145 + 1594 + 831 + 77	
EI/F	1	1	I,C	2001	2001	LT		7,490	0.255	4540-12340	Pike & Gunnlaugsson 2006, Wade 2009	Sum of EGI + WN-SPB blocks = 5405 + 2085. WN-SPB coverage went less far South than in previous years	
EI/F	1	1	I,C	2007	2007	LT		1,613	0.26	960-2680	Pike et al 2008	Not used in fin trials - see Feb 2015 wkshop report	
N	-	-	-	1988	1988							Estimates not available without further analysis. [1989? Buckland et al 1992b, Borchers and Burt 1997 Sigurjonsson et al 1991b]	
N			C	1995	1995	LT		3,964	0.21	2620-5980	Wade 2009	Skaug based on Øien 2003	
N			C	1999	1999	LT		3,749	0.24	2340-6000	Wade 2009	Skaug based on Øien 2003	
Sp			-	1982	1982			1,696	0.27	990-2870	Mizroch and Sanpera 1984	Not used in RMP trials as covered a smaller area than in 1989	
Sp			-	1987	1987			4,617	0.098	3,800-5,600	IWC 1992 p600; Buckland et al 1992b	Revised from Sanpera & Jover 1989. Not used in RMP trials as covered a smaller area than in 1989 (~½)	
Sp			C	1989	1989			17,355	0.265	10,400-28,900	IWC 1992 p606; IWC 1993 p67; Buckland et al 1992	42-52°S, extending out to 25°W	
Sp			-	1993	1993			7,507	0.15	5,600-10,100	Goujon et al 1995	Survey designed primarily for small cetaceans; not used in RMP trials as thought to cover a small area	
Med			-	1991	1991	LT		3,583	0.27	2,100-6,000	Forcado et al 1996, Notarbartolo di Sciara et al 2003	Estimate for the western basin portion of the Mediterranean, where most of the population is found.	

**See Wade 2009 (JCRM 2009 p448-9, Annex H) and IWC, 2009 p233-5 where the following pre-2007 estimates were discussed and summarised: Shipboard survey estimates in 1988 (Buckland *et al.*, 1992a), 1995 (Borchers and Burt, 1997), 2001 (Gunlaugsson *et al.*, 2002) and 2007 (Pike *et al.*, 2008).

North Atlantic other species

Species	Area	Cat.	Eval. Ext.	Date stamp	Range of years	Method	Correctn	Estimate	CV	Approx. 95% CI	Reference**	Notes	On Web?
Bowhead	Baffin Bay-Davis Str.**	1		2002	2002	LT	A+P	6,344	0.36	3,119-12,906	IWC, 2009 p23 & p188-190	Suitable for management advice for W. Greenland aboriginal harvest. Likely to be negatively biased because of i) the strip transect approach adopted and ii) the survey effort covered only a portion of the population	
Bowhead	West Greenland			2007	2007	LT	A+P	1,229	0.47	495-2,939	IWC, 2008 p36. Heide-Jørgensen et al, 2007	The estimate does not reflect a total population size, but is representative of the number of whales in W. Greenland in Winter.	
Bowhead	West Greenland			2012	2012	LT	A+P	744	0.34	357-1,461	IWC, 2015 p144 & 436. Rekdal et al 2015	Aerial survey (March-April)	
Bowhead	West Greenland	1		2012	2012	MR		1,274	0.12	967-1,581	IWC, 2015 p144 & 436. Rekdal et al 2015	Genetic mark recapture estimate. SC agreed this provides the best estimate of abundance for the no. of whales visiting W.Greenland.	**Y**
Bowhead	Foxe Basin – Hudson Bay	1		2003	2003		A+P	1,525	0.78	333-6,990	IWC, 2009 p23 & p188-190		
Bowhead	Isabella Bay			2009	2009	LT	A+P?	1,105	0.39	515-2,370	IWC, 2014 p445. Hansen et al, 2012	Summer season	
Bowhead	E. Canada/ W.Greenland			2013	2013	LT	A+P	6,446	0.26		Doniol-Valcrosze et al 2015	Corrected estimate	
Bowhead	E. Canada/ W.Greenland			2010	2008-12	GMR		7,660		4,500-11,100	Frasier et at 2015	5year period	
Sei	Faroes/Iceland			1987	1987	LT		1,293		434-3,853	Cattanach et al 1993		
Sei	Faroes/Iceland			1989	1989	LT		10,300		6,150-17,260	Cattanach et al 1993		
Sei	Faroes/Iceland			1995	1995	LT		9,249		3,700-23,116	Borchers and Burt 1997		
Sei	Faroes/Iceland			2001	2001	LT		1,494	0.24	843-2,245	Pike et al 2011c		
Sei	Faroes/Iceland			2007	2007	LT		4,924	0.49	1,224-10,591	Pike et al 2011c		
Humpback	W. Greenland			2005	2005	LT		1,158	0.35		IWC, 2009 p23	Agreed to be acceptable for use in assessments	
Humpback	W. Greenland			2007	2007	MRLT	A+P	4,090	0.50	1,620-10,324	IWC, 2014 p194. Heide-Jørgensen & Laidre, 2013	Original estimate was 3,299 cv0.57 (IWC,2009 p23, Heide-Jørgensen et al, 2012)	
Humpback	W. Greenland			2007	2007*	Strip census	A+P	2,704	0.34	1,402-5,215	IWC, 2014 p194. Heide-Jørgensen & Laidre, 2013	Original estimate was 3,039 cv0.45 (IWC,2009 p23, Heide-Jørgensen et al, 2012). This revised estimate, based on improved information on diving behaviour, is accepted as the best estimate.	**Y**
Humpback	Western N.Atlantic			1993	1992-93			11,570	0.07	10,290-13,390	IWC, 2002 p236 & 257. Stevick et al 2001 & 2003	See IWC 2002 p236 re possible biases.	**Y**
Humpback	Gulf of Main			1993	1992-93	MR		652	0.29		IWC, 2002 p235, YoNAH 2001	May be biased by heterogeneity in whale distribution patterns and in sampling effort.	
Humpback	Gulf of Main	2		1992	1992	Ph-ID		501			IWC, 2002 p235, YoNAH 2001	Minimum no. of individually identified whales	

Humpback	Gulf of Main	2	1997	1997	Ph-ID	497			IWC, 2002 p235, YoNAH 2001	Minimum no. of individually identified whales	
Humpback	Gulf of Main		1999	1999	LT	902	0.41		IWC, 2002 p235, YoNAH 2001	May be negatively biased as did not account for g(0). Includes areas of the Scotia Shelf.	
Humpback	Gulf of Main		1999	1999	LT	816	0.45		IWC, 2002 p235, YoNAH 2001	May be negatively biased as estimate for g(0) used did not account for dive time heterogeneity.	
Humpback	Canada				MR	1,807	0.05		IWC, 2002 p235, YoNAH 2001	Likely to be seriously negatively biased as sampling was highly spatially variable. Attempts to overcome this by stratifying data into 3 regions gave estimate of 2,509, CV=0.77.	
Humpback	Norwegian & Barents Seas		1988	1988	LT	1,126	0.31		IWC, 2002 p236, Pike et al, 2001.	May be negatively biased as did not account for g(0).	
Humpback	Norwegian & Barents Seas		1989	1989	LT	689	0.59		IWC, 2002 p236, Pike et al, 2001.	May be negatively biased as did not account for g(0).	
Humpback	Norwegian & Barents Seas		1995	1995	LT	889	0.32		IWC, 2002 p236, Pike et al, 2001	Does not account for g(0) so may be negatively biased. Øien, 2009 has 1,059 CV=0.248. Should this be used instead?	
Humpback	Norwegian & Barents Seas		1999	1996-2001	LT	4,695	0.39	2,124-10,378	Øien, 2009		
Humpback	Iceland	Needs further anal.	1995	1995	LT	14,600		5,100-41,500	IWC, 2002 p236, Pike et al, 2001	See IWC, 2002 p 236 for issues raised	
Blue	Central & NE Atlantic		1987	1987	LT	222	0.35	115-440	Pike et al 2009		
Blue	Central & NE Atlantic		1989	1989	LT	531	0.24	288-759	Pike et al 2009		
Blue	Central & NE Atlantic		1995	1995	LT	979	0.64	137-2,542	Pike et al 2009		
Blue	Central & NE Atlantic		2001	2001	LT	855	0.35	358-1,419	Pike et al 2009		
Blue	Gulf of St Lawrence			1979-2009	Ph-ID	440			NOAA 2010	Minimum estimate: 440 individuals identified	
Sperm	Norwegian & Barents Seas		1995	1995	LT	4,319	0.2	2,903-6,424	Øien, 2009		
Sperm	Norwegian & Barents Seas		1999	1996-2001	LT	6,375	0.22	4,163-9,762	Øien, 2009		
N.Atlantic right	W. N.Atlantic		2010	2010	Ph-ID	490			IWC, 2013 p38 & 175	IWC 2015 p33 & Pace 2014 report 455 individually recognised whales known to be alive during 2010 = minimum population	**Y**

North Pacific Minke whales

Sub-Area	Catgry	Eval. extent	RMP Status	Year	Methd	Corr.	Estimate	CV	Approx. 95% CI	IWC reference	Original reference	Comments on survey	Timing
5	2	1	Cmin, T	2001	LT	P	1,534	0.523	590-4,020	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Only area completed. Needs further analysis	Apr-May
5	2	1	Cmin, T	2004	LT	P	799	0.321	430-1,480	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Only area completed. Needs further analysis	Apr-Jun
5	2	1	Cmin, T	2008	LT	P	680	0.372	340-1,380	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Only area completed. Needs further analysis	Apr-May
5	2	1	T	2011	LT	P	587	0.405	270-1,260	JCRM 2014 Anx D1 Tab 6-7	Park et al. (2012)	Only area completed. Needs further analysis. Estimate acceptable but was not used in 2013 trials	Apr-May
6W	2	1	Cmin, T	2000	LT	P	549	0.419	250-1,210	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	May-Jun
6W	2	1	Cmin, T	2002	LT	P	391	0.614	130-1,180	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	May-Jun
6W	2	1	Cmin, T	2003	LT	P	485	0.343	250-930	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	Apr-May
6W	2	1	Cmin, T	2005	LT	P	336	0.317	180-620	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	Apr-May
6W	2	1	Cmin, T	2006	LT	P	459	0.516	180-1,190	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	Apr-May
6W	2	1	Cmin, T	2007	LT	P	574	0.437	250-1,300	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	Apr-May
6W	2	1	Cmin, T	2009	LT	P	884	0.286	510-1,530	JCRM 2014 Anx D1 Tab 6-7	An et al. (2010)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	Apr-May
6W	2	1	T	2010	LT	P	1,014	0.397	480-2,150	JCRM 2014 Anx D1 Tab 6-7	An et al. (2011)	Low area coverage. Use inshore segment only adjusted for differential extent of inshore coverage. No extrapolation	Apr-May
6E	2	1	C, T	2002	LT	P	891	0.608	300-2,670	JCRM 2014 Anx D1 Tab 6-7	Miyashita et al. 2009	Poor coverage & analysis difficulties. Poor availability. Northern part only used to avoid double counting.	May-Jun
6E	1	1		2003	LT	P	935	0.357	470-1,840	JCRM 2014 Anx D1 Tab 6-7	Miyashita et al. 2009	Northern part only used to avoid double counting.	May-Jun
6E	1	1		2004	LT	P	727	0.372	360-1,470	JCRM 2014 Anx D1 Tab 6-7	Miyashita et al. 2009	Incomplete coverage. N offshore block only used	May-Jun
10W	1	1		2006	LT	P	2,476	0.312	1,360-4,500	JCRM 2014 Anx D1 Tab 6-7	Miyashita & Okamura 2011	g(0)-corrected estimate 3,400 (2,600-4,400) Okamura et al. (2010)	May-Jun
10E	1	1		2002	LT	P	816	0.658	250-2,640	JCRM 2014 Anx D1 Tab 6-7	Miyashita et al. 2009	Sufficient effort to retain estimate (61% of pre-determined track line covered)	May-Jun
10E	1	1		2003	LT	P	405	0.566	140-1,140	JCRM 2014 Anx D1 Tab 6-7	Miyashita et al. 2009		May-Jun
10E	3	1	C	2004	LT	P	474	0.537	180-1,270	JCRM 2014 Anx D1 Tab 6-7	Miyashita et al. 2009	Design question: (most sightings in concentration near coast)	May-Jun
10E	1	1		2005	LT	P	599	0.441	260-1,370	JCRM 2014 Anx D1 Tab 6-7	IWC 2014 (2013 wkshp rep Annex G)	Survey blocks surveyed twice. Estimate recalculated using 2nd part & only in offshore block to avoid double counting, using estimates of ESW & s from the whole area. (No. of primary sightings: 1st part: 1 over 387 n.miles, 2nd part: 9 over 842 n.miles)	May-Jun
10E	3	1	C	2007	LT	P	575	0.327	310-1,070	JCRM 2014 Anx D1 Tab 6-7	Miyashita et al. 2009	Estimate used to condition a sensitivity trial	May-Jun
7CS	2	1	T	1991	LT	P	0			JCRM 2014 Anx D1 Tab 6-7	Butterworth & Miyashita 2014	The 7W estimate (1,164 cv 0.183, IWC 2004 p124) was split to subarea (prorated by nA/L from the total)	Aug-Sep

Sub-Area	Catgry	Eval. extent	RMP Status	Year	Methd	Corr.	Estimate	CV	Approx. 95% CI	IWC reference	Original reference	Comments on survey	Timing
7CS	2	1	C, T	2004	LT	P	504	0.291	290-880	JCRM 2014 Anx D1 Tab 6-7	IWC 2014 (2013 wkshp rep Item 2.2 & Annex G)	Estimate was recalculated for the northern part only (using estimates of ESW & s from the whole area).	May
7CS	2	1	C, T	2006	LT	P	3,690	1.199	600-23,500	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	Analysis for non-random start. Note different survey timings	Jun- Jul
7CS	2	1	T	2012	LT	P	537	0.346	269-1,070	SC/66b/Rep06	SC/F16/JR11	Replaces estimate of 890 cv 0.393 (Hakamada et al 2013, IWC 2014)	May-Jun
7CN	2	1	T	1991	LT	P	853	0.23	550-1,330	JCRM 2014 Anx D1 Tab 6-7	Butterworth & Miyashita 2014	The 7W estimate (1,164 cv 0.183, IWC 2004 p124) was split to subarea (prorated by nA/L from the total)	Aug-Sep
7CN	3	1	C	2003	LT	P	184	0.805	50-740	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	Inadequate and heterogeneous coverage	May
7CN	2	1	T	2012	LT	P	542	0.601	164-1,790	SC/66b/Rep06	SC/F16/JR11	Replaces estimate of 302 cv 0.454 (Hakamada et al 2013, IWC 2014)	May-Jun
7CN	2	1	T	2012	LT	P	599	0.525	205-1,757	SC/66b/Rep06	SC/F16/JR11	Replaces estimate of 389 cv 0.507 (Hakamada et al 2013, IWC 2014)	Jul-Aug
7WR	2	1	T	1991	LT	P	311	0.23	200-490	JCRM 2014 Anx D1 Tab 6-7	Butterworth & Miyashita 2014	The 7W estimate (1,164 cv 0.183, IWC 2004 p124) was split to subarea (prorated by nA/L from the total)	Aug-Sep
7WR	2	1	Cmin, T	2003	LT	P	267	0.70	80-920	JCRM 2014 Anx D1 Tab 6-7	IWC 2014 (2013 wkshp rep Item 2.2 & Annex G)	Low area coverage. Estimate recalculated for northern part only. With analysis for non random starts	May-Jun
7WR	1	1		2004	LT	P	863	0.648	270-2,750	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)		May-Jun
7WR	2	1	C, T	2007	LT	P	546	0.953	110-2,640	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	With analysis for non-random start.	Jun-Jul
7E	3	1		1990	LT	P	791	1.848	70-8,620	JCRM 2014 Anx D1 Tab 6-7	IWC 2004, p.124	CV too high to be meaningful. Pro-rata to fraction of area from 1990 estimate because of almost uniform distribution of effort in 1990 (by Miyashita 2002)	Aug-Sep
7E	1	1		2004	LT	P	440	0.779	110-1,700	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)		May-Jun
7E	1	1		2006	LT	P	247	0.892	60-1,110	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)		May-Jun
7E	2	1	C, T	2007	LT	P	0	-		JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	With analysis: non random start; no planned coverage in Russian EEZ (upper left)	Jun-Jul
8	1	1		1990	LT	P	1,057	0.706	300-3,680	JCRM 2014 Anx D1 Tab 6-7	IWC (2004, p.124), IWC 1997, p.203,211.	Agreed in 2003. Estimate extracted from Buckland et al., 1992. In other years, no whales observed in area not covered	Aug-Sep
8	1	1		2002	LT	P	0	-		JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	Note different survey timings	Jun-Jul
8	1	1		2004	LT	P	1,093	0.576	380-3,120	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	In other years, no whales observed in area not covered	Jun
8	2	1	C, T	2005	LT	P	132	1.047	24-710	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	With analysis: non random start; no planned coverage in Russian EEZ (upper left), 2 sets of lines in lower blocks	May-Jul
8	1	1		2006	LT	P	309	0.677	90-1,030	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)		May-Jul
8	2	1	C, T	2007	LT	P	391	1.013	80-2,030	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	With analysis: non random start; no planned coverage in Russian EEZ (upper left)	Jun-Jul
9	1	1		1990	LT	P	8,264	0.396	3,900-17,500	JCRM 2014 Anx D1 Tab 6-7	IWC (2004, p.124), IWC 1997, p.203,211.	Agreed in 2003. Estimate extracted from Buckland et al., 1992.	Aug-Sep

Sub-Area	Catgry	Eval. extent	RMP Status	Year	Methd	Corr.	Estimate	CV	Approx. 95% CI	IWC reference	Original reference	Comments on survey	Timing
9	1	1		2003	LT	P	2,546	0.276	1,500-4,330	JCRM 2014 Anx D1 Tab 6-7	Hakamada & Kitakado (2010)	Survey not co-incident with density peak in Aug-Sept	Jul-Sep
9N	1	1		2005	LT	P	420	0.969	90-2,070	JCRM 2014 Anx D1 Tab 6-7	Miyashita & Okamura 2011	Agreed estimate. Not used as catch limits are not set for 9N. g(0)-corrected estimate 2,080 (1,600-2,600) for SA 8+9+12, Okamura et al. (2010)	Aug-Sep
11	1	1		1990	LT	P	2,120	0.449	920-4,910	JCRM 2014 Anx D1 Tab 6-7	IWC (2004, p.124), IWC 1997, p.203,211.	Agreed in 2003. Estimate extracted from Buckland et al., 1992.	Aug-Sep
11	1	1		1999	LT	P	1,456	0.565	520-4,090	JCRM 2014 Anx D1 Tab 6-7	IWC (2004, p.124); IWC 2003, p.470-2	Agreed in 2003. Estimate is based on pooling data from 1999 and 2000 surveys (see IWC 2003 p470-2)	Aug-Sep
11	2	1	C, T	2003	LT	P	882	0.820	220-3,600	JCRM 2014 Anx D1 Tab 6-7	Miyashita & Okamura 2011	Potential bias due to weather induced coverage omission to North. Not acceptable to include coastal transect in analysis. Estimate refers to surveyed part of subarea only and excludes transit legs. corrected estimate 42,100 (32,700-54,200) in SA 11+12SW+NE Okamura et al. (2010)	Aug-Sep
11	2	1	Cmin, T	2007	LT	P	377	0.389	180-790	JCRM 2014 Anx D1 Tab 6-7	Miyashita & Okamura 2011	Low area coverage. Estimate confirmed to come from transect lines only. g(0)-corrected estimate 500 (250-1,000) in SA11. Okamura et al. (2010)	Aug-Sep
12SW	2	1	C, T	1990	LT	P	5,244	0.806	1,300-21,000	JCRM 2014 Anx D1 Tab 6-7	IWC (2004, p.124)	Agreed in 2003. Estimate from IWC 2003, p470-2 with CV recalculated (Miyashita)	Aug-Sep
12SW	2	1	C, T	2003	LT	P	3,401	0.409	1,570-7,350	JCRM 2014 Anx D1 Tab 6-7	Miyashita & Okamura 2011	Low area coverage. Estimate refers only to part of sub-area with adequate coverage. g(0)-corrected estimate 42,100 (32,700-54,200) in SA 11+12SW+NE Okamura et al. (2010)	Aug-Sep
12NE	2	1	C, T	1990	LT	P	10,397	0.364	5,200-20,800	JCRM 2014 Anx D1 Tab 6-7	IWC 2004, p.124	Agreed in 2003. Estimate from IWC 2003, p470-2 with CV recalculated (Miyashita)	Aug-Sep
12NE	2	1	C, T	1992	LT	P	11,544	0.38	5,620-23,700	JCRM 2014 Anx D1 Tab 6-7	IWC (2004 p.124); Miyashita & Shimada (1994); IWC (1997 p211)	Agreed in 2003. Estimate from IWC 2003, p470-2 with CV recalculated (Miyashita). Miyashita & Shimada 1994 estimate for SA 12: 10,897 cv 0.46 91.2% areal coverage was scaled up (=11,948) 'to render it comparable to that from 1989/90' (IWC 1997 p211) and split between 12SW (404) & NE (11,544). [$]Wrong year (1999) used when conditioning trials (IWC 2014)	Aug-Sep
12NE	2	1	T	1999	LT	P	5,088	0.377	2,500-10,400	JCRM 2014 Anx D1 Tab 6-7	IWC 2014 (2013 wkshp rep Item 2.2 & Annex G)	Omit E block – inadequate coverage. Limit N block to area surveyed. Estimate recalculated using only those parts of the strata that were covered effectively	Aug-Sep
12NE	2	1	C, T	2003	LT	P	13,067	0.287	7,500-22,700	JCRM 2014 Anx D1 Tab 6-7	Miyashita & Okamura 2011	Estimate is based on the 3 blocks with adequate survey coverage; for the northernmost block includes only the area covered by completed transects. 2 blocks with inadequate coverage are omitted. g(0)-corrected estimate 42,100 (32,700-54,200) in SA 11+12SW+NE Okamura et al. (2010)	Aug-Sep
N of 35N, 140-170E				2008			3,080	0.677		SC/66b/Rep06	SC/F16/JR12		

North Pacific Bryde's whales

Population	Area	Cat.	Eval. extent	RMP Status	Date stamp	Range of years	Methd	Corr.	Estimate	CV	Approx. 95% CI	IWC reference	Original reference	Notes	On Web?
Western	1W	1	1	I, C	2000	1998-2002	LT		4,957	0.398	2,270-10,810	IWC (2009, pp.6-7);	Kitakado et al (2009); Shimada et al (2009)		
Western	1E	1	1	I, C	1999	1998-2002	LT		11,213	0.498	4,220-29,750	As for 1W	As for 1W		
Western	2	1	1	I, C	2002	1998-2002	LT		4,331	0.553	1,460-12,800	As for 1W	As for 1W		
Western	**Combined WNP**				2000	1998-2002	**LT**		**20,501**	**0.31**	**11,000-38,000**			**Combined est = 21,000**	**Y**
Pelagic	N of 35N, 140E-170E				2008	2008			13,306	0.251		SC/66b/Rep06	SC/F16/JR12		

North Pacific Other whales (Bowhead BCB = Bering-Chukchi-Beaufort seas)

Species	Population	Area	Cat.	Eval. extent	Date stamp	Range of years	Methd	Corr.	Estimate	CV	Approx. 95% CI	IWC reference	Original reference	Notes	On Web?
Gray	Eastern Pacific	N. Pacific/ Arctic			1968	1968			13,426	0.094			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1969	1969			14,548	0.08			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1970	1970			14,553	0.083			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1971	1971			12,771	0.081			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1972	1972			11,079	0.092			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1973	1973			17,365	0.079			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1974	1974			17,375	0.082			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1975	1975			15,290	0.084			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1976	1976			17,564	0.086			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1977	1977			18,377	0.08			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1978	1978			19,538	0.088			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1979	1979			15,384	0.08			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1980	1980			19,763	0.083			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1985	1985			23,499	0.089			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1986	1986			22,921	0.081			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1988	1988			26,916	0.058			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1993	1993			15,762	0.067			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1994	1994			20,103	0.055			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1996	1996			20,944	0.061			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			1998	1998			21,135	0.068			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			2001	2001			16,369	0.061			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			2002	2002			16,033	0.069			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			2007	2007			19,126	0.071			Laake *et al*. (2012)		
Gray	Eastern Pacific	N. Pacific/ Arctic			2007	2007			20,750	0.06	18,860-23,320		Durban *et al*. (in pr)		

Species	Population	Area	Cat.	Eval. extent	Date stamp	Range of years	Methd	Corr.	Estimate	CV	Approx. 95% CI	IWC reference	Original reference	Notes	On Web?
Gray	Eastern Pacific	N. Pacific/ Arctic			2008	2008			17,820	0.054	16,150-19,920		Durban *et al*. (in pr)		
Gray	Eastern Pacific	N. Pacific/ Arctic			2010	2010			21,210	0.046	19,420-23,230		Durban *et al*. (in pr)		
Gray	Eastern Pacific	N. Pacific/ Arctic			2011	2011			20,990	0.044	19,230-22,900		Durban *et al*. (in pr)		
Gray	Western Pacific				2007	2007			121		112 - 130	IWC website			Y
Bowhead	BCB	N. Pacific/ Arctic			1978	1978			4,765	0.305			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1980	1980			3,885	0.343			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1981	1981			4,467	0.273			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1982	1982			7,395	0.281			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1983	1983			6,573	0.345			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1985	1985			5,762	0.253			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1986	1986			8,917	0.215			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1987	1987			5,298	0.327			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1988	1988			6,928	0.12			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			1993	1993			8,167	0.071			Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			2001	2001			10,545	0.128	8,000-13,000		Zeh and Punt (2005)		
Bowhead	BCB	N. Pacific/ Arctic			2004	2004			12,631	0.244			Koski *et al*. (2010)	11,800 on IWC website?	
Bowhead	BCB	N. Pacific/ Arctic			2011	2011			16,820	0.052	15,176-18,643		Givens *et al*. (2016)	Rev. from 16,892: Givens et al 2014	
Sei	Sei	Western N. Pacific (W of 170°E)				2002-7			7,646	0.272			Hakamada et al 2009	Early season estimate Tab 5 (chk)	
Sei	Pelagic	N of 35N, 140E-170E				2008			5,264	0.378		SC/66b/Rep06	SC/F16/JR12		
Sei	Sei	Central & eastern N. Pacific (N of 40N, S of Alaska 170E-135W)	1	1	2011	2010-12	LT	P	29,632	0.422	18,576-47,267	IWC 66a	SC/66a/IA12	Agreed for Indepth Assessment, SC66a AnnexG (page2),	
Blue		Eastern N. Pacific	1	2	1993	1993	MR		2,000	0.2	1400-3000	IWC 66a	Calambokidis and Barlow (2004)		
Blue		Eastern N. Pacific	1	2	1997	1997	MR		1,756	0.21	1200-2700	IWC 66a	Calambokidis *et al.* (2007)		
Blue		Eastern N. Pacific	1	2	2002	2002	MR		1,781	0.23	1100-2800	IWC 66a	Calambokidis *et al.* (2007)		
Blue		Eastern N. Pacific	1	2	2006	2006	MR		2,842	0.29	1600-5000	IWC 66a	Calambokidis *et al.* (2007)		
Blue		Eastern N. Pacific	1	2	2008	2008	MR		2,497	0.18	1800-3600	IWC 66a	Calambokidis *et al.* (2009)	Trend: flat or slightly increasing at 2.0% per year, with a 90% probability of increase (Monnahan *et al.*, 2015).	
Blue		N of 35N, 140-170E			2008	2008	LT		967	0.452			SC/F16/JR13	Jul-Aug	
Blue		N of 35N, 140-170E			2012	2012	LT		181	0.496			SC/F16/JR13	May-Jun	
Fin		N of 35N, 140-170E			2008	2008	LT		3,992	0.421			SC/F16/JR13	Jul-Aug	
Fin		N of 35N, 140-170E			2012	2012	LT		1,354	0.287			SC/F16/JR13	May-Jun	

Species	Population	Area	Cat.	Eval. extent	Date stamp	Range of years	Methd	Corr.	Estimate	CV	Approx. 95% CI	IWC reference	Original reference	Notes	On Web?
Humpback		N of 35N, 140-170E			2008	2008	LT		406	0.509			SC/F16/JR13	Jul-Aug	
Humpback		N of 35N, 140-170E			2012	2012	LT		1,886	0.309			SC/F16/JR13	May-Jun	
NP right		Western N Pacific, 35N-52N, 140-170E	1	1	2008	2008	LT		404	0.56		IWC/66b/Rep06	SC/F16/JR13	May-Jun, taking into account of analysis suggestion from SC members.	
NP right		Western N Pacific, 35N-52N, 140-170E	1	1	2012	2012	LT		1,137	0.371		IWC/66b/Rep06	SC/F16/JR13	May-Jun, taking into account of analysis suggestion from SC members.	
Sperm		N of 35N, 140-170E			2008	2008	LT		10,857	0.342			SC/F16/JR14	Jul-Aug	
Sperm		N of 35N, 140-170E			2009	2009	LT		11,701	0.296			SC/F16/JR14	May-Jun	
Sperm		N of 35N, 140-170E			2012	2012	LT		10,389	0.236			SC/F16/JR14	May-Jun	

Southern Ocean Minke whales

Area	Cat.	Evaltn extent	Date stamp	Range of years	Methd	Corr.	Estimate	CV int	CV w.AV	Approx. 95% CI	IWC reference	Original reference	Comments on survey
Area I			1988				85,688	0.16	0.34				CPII
Area I	1	1	1998	1994, 2000,1	LT+SM	P	38,900	0.20	0.39	18,100-83,500	IWC, 2013	SC/64/IA2, SC/64/IA13, SC/64/Rep4	Parts of Area I surveyed in 1994, 2000 & 2001. See *
Area II			1988				130,083	0.14	0.40				CPII
Area II	1	1	1998	1997,8, 2000	LT+SM	P	57,200	0.19	0.38	27,200-120,000	IWC, 2013	SC/64/IA2, SC/64/IA13, SC/64/Rep4	Parts of Area II surveyed in 1997, 1998 & 2000. See *
Area III			1988				93,215	0.20	0.44				CPII
Area III	1	1	1998	1993,5	LT+SM	P	94,200	0.15	0.35	47,400-187,000	IWC, 2013	SC/64/IA2, SC/64/IA13, SC/64/Rep4	Parts of Area III surveyed in 1993 & 1995. See *
Area IV			1988				55,237	0.17	0.39				CPII
Area IV	1	1	1998	1995,9	LT+SM	P	59,700	0.34	0.49	22,800-156,000	IWC, 2013	SC/64/IA2, SC/64/IA13, SC/64/Rep4	Parts of Area IV surveyed in 1995 & 1999. See *
Area V			1988				300,214	0.13	0.31				CPII
Area V	1	1	1998	1992, 2002,3,4	LT+SM	P	183,900	0.11	0.36	90,800-372,000	IWC, 2013	SC/64/IA2, SC/64/IA13, SC/64/Rep4	Parts of Area V surveyed in 1992, 2002, 03 & 04. See *
Area VI			1988				55,617	0.22	0.39				CPII
Area VI	1	1	1998	1996, 2001	LT+SM	P	80,800	0.14	0.37	39,100-167,000	IWC, 2013	SC/64/IA2, SC/64/IA13, SC/64/Rep4	Parts of Area VI surveyed in 1996 & 2001. See *
Circum-polar			1988	1985-1991			720,054	0.08	0.18	512,000 - 1,012,000			CPII
Circum-polar	1	1	1998	1992-2001			514,700	0.09	0.18	360,000 – 730,000	IWC, 2013		CPIII

* The date-stamp relates to the mid-point in time of the CPIII series. The estimates given for CPIII are the 'best average number'.
To examine relative changes between CPII and CPIII it is better to use the 'CNB' estimates listed in IWC, 2014 p248, which avoid the confounding effects of changing northern survey boundaries.

Southern Ocean other species: to come

References – to come.