Reconsideration of the population status of the J stock common minke whales

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BACKGROUND

J stock common minke whales are classified under the New Management Procedure as a "protection stock" (paragraph 10 (c) of the Schedule) and are also below the "protection level" of 0.54 adopted by the Commission as part of its acceptance of the Scientific Committee's recommendation for a single-stock management procedure for baleen whales (the Revised Management Procedure (RMP) (1992-Appendix3 Resolution on the Revised Management System). However, recent information strongly suggests that these designations are no longer valid.

1. Population Estimates

In 1986, the Scientific Committee recommended that the J stock be classified as a protection stock (PS) based on analysis of Korean CPUE data which is a crude and unreliable method of estimating abundance compared to sighting surveys. The analysis was conducted again in 1987 and reconfirmed the PS status. Assuming that MSYR=1% and 4%, the assessment based on Korean CPUE data suggested that a depletion to 18.4%-43.0%, for an initial population size in 1962 of 13,432-14,300 and a 1987 stock size of 2,435-6,145 (IWC, 1988). More recently, Japan and Korea have conducted a series of sighting surveys in sub-areas (SAs) 5, 6 and 10 which are considered as main habitat areas of the J stock common minke whales. Although parts of SA5 and SA6 were not covered by these surveys, information on abundance from sighting data from surveys in the rest of the areas can be integrated for obtaining better knowledge on abundance of J stock animals. The results showed that the estimate of total abundance in surveyed areas was 7,103 (CV=0.230) and the spatially extrapolated estimates in the whole of SA5, SA6 and SA10 was 16,162 (CV=0.277). It should be noted that because J stock animals are also distributed in the East China Sea, the Pacific coast of Japan and the Sea of Okhotsk (IWC 2004, Kanda et al. 2009), these numbers are underestimates. The results indicate that either the 1987 estimate was an underestimate or that the abundance of J stock animals has increased.

2. Trajectory

By using the HITTER methodology population trajectory of the J stock common minke whales from 1985 is examined. It is concluded that the population trajectory shows the present depletion in 2010 is more than 54% (i.e. above the "protection level") in most of the cases and has an increasing trend in all cases examined except MSYR=1%

2.1 Methods

The abundance of J stock depends on the proportion of the O stock in the Okhotsk Sea. However, we have no reliable information on the proportion of the stock in this area so we conducted sensitivity tests on the proportions shown in Table 1 including the base case used for the IST for the western North Pacific minke whale (IWC, 2004). Applying these assumed proportions to abundance estimates of the O stock in the Okhotsk Sea in 2003 (SC/62/NPM6) and adding abundance estimates of J stock in sub-areas 5, 6 and 10 in 2009 (SC/62/NPM8), abundance estimates (16,249 – 24,873) and their CVs were obtained assuming g(0) estimate of 0.798 in SC/62/NPM9 (Table 2). These estimates are for the combined area of distribution in Japanese and Korean waters.

It was assumed the numbers of incidental catches off Korea during 1988-2001 are the same as used for the IST for this species and that those during 2002-2007 are as reported in the progress report of the Republic of Korea. As for the number of incidental catches off Japan, for the period 1955-2000 estimates using BPUE data (SC/62/NPM4) was used (Table 3). From 2001 to 2008 incidental catches reported in Japan's progress reports were used because the number is reliable due to a new regulation on incidental catch implemented in 2001. The numbers of the commercial catches and the research takes were also taken into account. Except for the numbers of the past incidental catches off Japan, assumptions are the same as in the application of HITTER to J stock presented in SC/61/O15.

2.2 Results

Tables 4, 5 and 6 show the trajectories for both the best estimate of population abundance and for the lower limit of the 90% confidence interval of the estimate of population abundance for the base case, for sensitivity test 1, and for sensitivity test 2 respectively.

For the best estimate of the base case (Table 4) depletion in 2010 is more than 54% except when MSYR=1% and 2% was assumed.

For the best estimate of sensitivity test 1 (Table 5) depletion in 2010 is above 54% for all MSYR values and much higher than that in 1985.

Depletion in 2010 is also more than 54% when MSYR= 4% and 5% for the best estimate of sensitivity test 2 (Table 6).

Although Tables 4, 5 and 6 show that using the lower limit of the 90% confidence intervals of the abundance estimates results in depletion in 2010 that is still less than 54%, recovery from 1985 was observed except in cases where *MSYR*=1% is assumed.

CONCLUSIONS

The absolute abundance estimated in 1987 based on the CPUE analysis (2,435-6,145) is much less than that from our analysis (7,103-16,162) (NPM8). While these numbers are not directly comparable the newer estimate is even more conservative than the Korean CPUE analysis in terms of geographic coverage. This suggests that the assessment in 1987 may have been an under estimate or that the abundance of J stock animals has increased. The population trajectories show that the present depletion in 2010 is above the RMP protection level (i.e. more than 54%) in most of the cases and has an increasing trend in all the cases examined except *MSYR*=1%. Therefore, the commonly held perception that J stock remains heavily depleted should be revised.

Table 1. Proportion of the J stock in the Okhotsk Sea by sub-area.

	SA11	SA12SW	SA12NE
Base case*	0.225	0.046	0.000
Sensitivity 1	0.500	0.250	0.250
Sensitivity 2	0.050	0.000	0.000

*: *IST* for the western North Pacific for the minke whale (IWC, 2004)

Table 2. Abundance estimates of J stocks in 2006 used in this study assuming g(0)=0.798***.

	Abundance estimate	CV
Base case**	16,924	0.266
Sensitivity** 1	24,873	0.192
Sensitivity** 2	16,249	0.276

:SC/62/NPM6 and SC/62/NPM8, *:SC/NPM9.

Table 3. Estimated numbers of the incidental catches in the coast of Japan (SC/62/NPM4).

year	reported	corrected
1955-78	3.8	14
1979	0	0
1980	3	11
1981	0	0
1982	0	0
1983	8	30
1984	4	15
1985	2	8
1986	13	49
1987	4	15
1988	8	30
1989	8	30
1990	20	75
1991	5	19
1992	8	30
1993	14	53
1994	16	60
1995	20	75
1996	27	102
1997	27	102
1998	24	91
1999	19	72
2000	28	106

Table 4. The case assuming estimated number of the previous incidental catches with abundance estimate for the base case. Shaded cells indicate the stock is not PS (i.e. more than 54% of initial population size *K*).

a) Hit 2006 total (1+) population of 16,924 (best estimate)

Statistic	MSYR (1+) (%)				
	1	2	3	4	5
K (1+)	34,782	30,069	26,632	24,099	22,231
Depletion - 1985 *	43.1%	39.9%	37.2%	35.1%	33.7%
Depletion - 2010	43.7%	49.6%	55.4%	60.9%	66.0%
Depletion - 2015	43.1%	50.7%	57.9%	64.3%	69.7%
Depletion - 2021	42.2%	51.9%	60.6%	67.6%	73.1%
Depletion - 2030	40.9%	53.7%	64.2%	71.7%	76.8%
Depletion - 2040	39.4%	55.6%	67.5%	74.9%	79.2%
RY - 2010	156	244	295	315	314
MSY (+1)	209	361	479	578	667

b) Hit 2006 total (1+) population of 11,014 (lower limit of 90%CI)

Statistic	MSYR (1+) (%)				
	1	2	3	4	5
K (1+)	29,796	25,679	22,601	20,251	18,422
Depletion - 1985 *	33.3%	29.0%	25.1%	21.5%	18.4%
Depletion - 2010	31.5%	35.6%	39.6%	43.6%	47.4%
Depletion - 2015	30.2%	36.0%	41.8%	47.3%	52.4%
Depletion - 2021	28.4%	36.4%	44.3%	51.5%	57.8%
Depletion - 2030	25.6%	37.1%	48.1%	57.4%	64.6%
Depletion - 2040	22.4%	37.9%	52.2%	62.9%	69.9%
RY - 2010	128	209	270	311	336
MSY (+1)	179	308	407	486	553

Table 5. The case assuming estimated number of the previous incidental catches with abundance estimate for sensitivity 1.

a) Hit 2006 total (1+) population of 24,873 (best estimate)

Statistic	MSYR (1+) (%)				
	1	2	3	4	5
K (1+)	41,886	36,737	33,158	30,693	29,023
Depletion - 1985 *	52.9%	51.3%	50.2%	50.0%	50.4%
Depletion - 2010	55.1%	62.0%	68.4%	73.8%	78.2%
Depletion - 2015	54.9%	63.3%	70.5%	76.2%	80.4%
Depletion - 2021	54.5%	64.6%	72.6%	78.4%	82.3%
Depletion - 2030	54.1%	66.5%	75.3%	80.9%	84.2%
Depletion - 2040	53.6%	68.3%	77.5%	82.6%	85.4%
RY - 2010	178	264	299	301	287
MSY (+1)	251	441	597	737	871

b) Hit 2006 total (1+) population of 18,182 (lower limit of 90%CI)

Statistic	MSYR (1+) (%)				
	1	2	3	4	5
K (1+)	35,881	31,077	27,597	25,062	23,219
Depletion - 1985 *	44.9%	41.9%	39.5%	37.8%	36.8%
Depletion - 2010	45.8%	52.0%	58.0%	63.6%	68.7%
Depletion - 2015	45.3%	53.2%	60.5%	66.8%	72.0%
Depletion - 2021	44.5%	54.4%	63.0%	69.9%	75.1%
Depletion - 2030	43.4%	56.3%	66.5%	73.7%	78.4%
Depletion - 2040	42.1%	58.2%	69.6%	76.6%	80.5%
RY - 2010	160	248	296	313	309
MSY (+1)	215	373	497	601	697

Table 6. The case assuming estimated number of the previous incidental catches with abundance estimate for sensitivity 2.

a) Hit 2006 total (1+) population of 16,249 (best estimate)

Statistic	MSYR (1+) (%)				
	1	2	3	4	5
K (1+)	34,197	29,538	26,127	23,601	21,722
Depletion - 1985 *	42.1%	38.7%	35.9%	33.6%	32.0%
Depletion - 2010	42.5%	48.3%	53.9%	59.4%	64.4%
Depletion - 2015	41.8%	49.3%	56.4%	62.8%	68.2%
Depletion - 2021	40.8%	50.5%	59.1%	66.3%	71.9%
Depletion - 2030	39.4%	52.2%	62.8%	70.6%	75.8%
Depletion - 2040	37.8%	54.0%	66.2%	74.0%	78.5%
RY - 2010	153	241	293	316	317
MSY (+1)	205	354	470	566	652

b) Hit 2006 total (1+) population of 10,413 (lower limit of 90%CI)

Statistic	MSYR (1+) (%)				
	1	2	3	4	5
K (1+)	29,308	25,271	22,247	19,935	18,131
Depletion - 1985 *	32.1%	27.8%	23.8%	20.2%	17.0%
Depletion - 2010	30.0%	33.8%	37.7%	41.3%	45.0%
Depletion - 2015	28.6%	34.2%	39.7%	45.0%	50.0%
Depletion - 2021	26.7%	34.4%	42.1%	49.2%	55.5%
Depletion - 2030	23.7%	34.8%	45.8%	55.2%	62.6%
Depletion - 2040	20.2%	35.4%	49.8%	61.0%	68.5%
RY - 2010	125	204	265	308	336
MSY (+1)	176	303	400	478	544