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# Length data highlight falsification of Japanese sperm whale catch statistics in the Southern Hemisphere

Phillip Clapham, Yulia Ivashchenko



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# Length data highlight falsification of Japanese sperm whale catch statistics in the Southern Hemisphere

PHILLIP J. CLAPHAM AND YULIA V. IVASHCHENKO

Marine Mammal Laboratory, Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, WA 98115, USA

Corresponding author: [phillip.clapham@noaa.gov](mailto:phillip.clapham@noaa.gov)

**ABSTRACT** Falsification of reports on Japanese catches of sperm whales (*Physeter macrocephalus*) is known to have occurred at land whaling stations (Kasuya 1999). Last year, comparisons of verified Soviet length data with those reported by Japanese factory fleets demonstrated the implausibility of the latter, and indicated systematic mis-reporting of North Pacific sperm whale catches to the IWC (Ivashchenko and Clapham 2015). Here, we conduct a similar analysis for pelagic sperm whale catches in the Southern Hemisphere: we compare true Soviet length data from the *Yuri Dolgorukiy* factory fleet during 1960-75 to data for the same period reported to IWC by Japan. Prior to implementation of the International Observer Scheme (IOS) in 1972, the Soviet fleet killed 5,536 females, of which only 153 (2.8%) were at or above the minimum legal length of 11.6 m. In contrast, during the same period, Japan killed 5,799 females but reported that 5,686 (98.5%) were of legal size. Categorizing lengths into half-meter bins shows that 5,133 of the Japanese whales - or 88.5% of the entire length distribution - were reported as being between 11.6 and 12.0 m. This clearly unrealistic distribution, together with the fact that Japanese fleets were supposedly able to catch 37 times the number of legal-sized females as the Soviet fleet, indicates extensive falsification of sperm whale catch data by Japan. Further evidence of mis-reporting is that females >11.5 m dropped to 9.1% of the Japanese catch after 1971, when the IOS made cheating much more difficult. That 99.6% of 10,433 males in the pre-IOS catch were also reported as of legal size (significantly higher than the equivalent Soviet figures) suggests that falsification and illegal catches were not confined to females. Overall, we conclude that the Japanese sperm whale data in the IWC Catch Database are unreliable and should not be used in population assessments. The ease with which illegal catches were apparently made underscores the past failures of the IWC to effectively regulate whaling.

KEYWORDS: WHALING, ILLEGAL WHALING, SOUTHERN HEMISPHERE, SPERM WHALE, JAPAN, USSR

## INTRODUCTION

The systematic falsification by Japanese land whaling stations of catch numbers as well as biological data (length and sex) for sperm whales (*Physeter macrocephalus*) was previously demonstrated (Kasuya 1999, Kasuya and Brownell 1999, Kondo and Kasuya 1999). Recently, Ivashchenko and Clapham (2015) used verified length data from Soviet whaling to show the unreliability of length data for catches of female sperm whales reported to the IWC by Japanese factory fleets operating in the North Pacific, indicating extensive misreporting in the pelagic fishery. The Soviet data were contained in formerly secret whaling industry reports that were declassified following revelations regarding the extensive campaign of illegal whaling conducted by the USSR after World War 2 (Yablokov 1994, Ivashchenko *et al.* 2011). Data falsifications in both the land-based and pelagic fisheries involved increasing the reported lengths of undersized animals to figures at or above the 11.6 m minimum length that was in force for sperm whales until 1972.

It is noteworthy that the IWC itself was at the time apparently aware that the minimum size limit was routinely being disregarded. For example, at its annual meeting in 1965, some Commissioners expressed great concern about the increased catches of sperm whales, but the Commission concluded as follows:

50 “Moreover, while the minimum size limit—38 feet—should be enough to save the great majority of  
51 females, massive evidence was available to the Commission to show that this regulation was being  
52 broken on a large scale.” (IWC 1967, p. 19)  
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54 The report gives no indication of which countries were suspected of violating the rule. Nor does the report state what  
55 this “massive evidence” was, though it was probably related to unrealistic length distributions in reported data. It was  
56 also noted by some that the relatively low average production of oil per whale in catches by Japan and others indicated  
57 that many undersized animals were being caught (Tønnessen and Johnsen 1982, p. 626). Despite these suspicions, no  
58 action was taken on this matter at the time.

59 Here, we follow up on the North Pacific study conducted by Ivashchenko and Clapham (2015). We conduct a similar  
60 comparative analysis of Japanese and Soviet sperm whale catches from the Southern Hemisphere, and conclude that  
61 extensive falsification occurred in Japanese factory fleets in that region.  
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## 63 MATERIALS AND METHODS

64 Catch data reported to the IWC by the USSR for whaling operations were routinely falsified, including for the Southern  
65 Hemisphere. However, true catch data preserved by D. Tormosov are available as individual catch records ( $n = 51,476$ ,  
66 all species) for the *Yuri Dolgorukiy* factory fleet, which operated between 1960 and 1975; this data set contains records  
67 of date, location, sex and length for 23,961 sperm whales, of which 5,536 were female.  
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69 In this study, we conducted a similar comparative analysis to that reported for North Pacific sperm whales by  
70 Ivashchenko and Clapham (2015). We used the verified true data from the *Yuri Dolgorukiy* database to assess the  
71 reliability of the official Japanese catch statistics as compiled in the IWC’s catch database (Allison 2012). We focused  
72 on the years 1960-1975, the years for which both Soviet and Japanese length data are available; additional data are given  
73 for 1976-79 for the Japanese fleets (*Yuri Dolgorukiy* ceased operations in 1975).  
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75 For the two data sources, we examined the number of female sperm whales whose length was equal to or greater than  
76 11.6 m, the IWC’s minimum allowable length for catches of this species (referred to here as Legal-Sized Females,  
77 LSFs). Unlike in the Ivashchenko and Clapham (2015) analysis, we did not factor in catcher effort, for reasons that are  
78 explained below.

79 In 1972, the IWC implemented the International Observer Scheme (IOS) (IWC 1971); at this time, independent  
80 inspectors began working on factory ships, thus (in theory) eliminating or greatly reducing illegal catches.  
81 Consequently, and as with the North Pacific study, we hypothesized that if female length data were misreported by Japan  
82 prior to the IOS, the occurrence of female sperm whales measuring at or above the pre-1972 minimum legal length<sup>1</sup>  
83 should be markedly lower when catches were independently inspected in years after the IOS was introduced.  
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## 85 RESULTS

86 Comparisons of the number of female sperm whales killed by Japanese fleets and by the Soviet floating factory *Yuri*  
87 *Dolgorukiy*, by year and length, are shown in Table 1 (1960-1971) and Table 2 (1972-79, the post-IOS years). A more  
88 detailed breakdown of the length distribution of sperm whale catches by the two countries is shown in Table 3 (1960-71)  
89 and Table 4 (1972-79, the post-IOS years).  
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91 Before implementation of the IOS in 1972, the Soviet fleet killed 5,536 females, of which only 153 (2.8%) were at  
92 or above the minimum legal length of 11.6 m. In contrast, during the same period, Japan killed 5,799 females but  
93 reported that 5,686 (98.5%) were of legal size. This difference is extremely significant ( $\chi^2 = 3,716.3$ ,  $df = 1$ ,  $p < 0.0001$ ).  
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<sup>1</sup> The minimum length was reduced by IWC to 9.2 m in 1972; thus, smaller females were legal to catch after this date. However, because we wanted to investigate potentially illegal catches prior to implementation of the IOS, our analysis focused on the frequency of occurrence of 11.6+ m females before *and* after the introduction of inspection.

95 Sorting lengths into half-meter bins (Table 3) shows that 5,133 of the Japanese whales - or 88.5% of the entire length  
 96 distribution - were reported as being between 11.6 and 12.0 m. Lengths distributions for both Japanese and Soviet pre-  
 97 IOS catches are shown in the top panel of Figure 1.

98 Because introduction of the IOS in 1972 made illegal whaling much more difficult, we predicted that the frequency  
 99 of LSFs in the Japanese catch data should markedly decrease in subsequent years, and be more similar to the numbers  
 100 taken by the USSR. This was the case: the proportion of LSFs declined from 98.1% (5,686 of 5,799) to 9.1% (152 of  
 101 1,665) after 1971; compared to the equivalent pre-IOS Japanese numbers, the difference is highly significant ( $\chi^2$   
 102 =1,078.3, df=1,  $p < 0.00001$ ). The number of LSFs in the Soviet catch was small both before and after the IOS (2.8%  
 103 and 4.1%, respectively), although the difference between the two periods is still significant ( $\chi^2 = 12.56$ , df=1,  $p =$   
 104 0.0004).

105 The difference between the two nations' post-IOS LSF figures was also highly significant ( $\chi^2 = 49.0$ , df=1,  $p < 0.0001$ ).  
 106 A comparison of both nations' length distributions before and after the IOS is shown in Figure 1.

107 Similarly, very large females (arbitrarily defined here as those with a length greater than 12 m) were 22 times more  
 108 commonly reported in the Japanese catch than were present in the Soviet takes (553 of 5,799 versus 24 of 5,536,  
 109 respectively; Table 3). This was not the case after 1972 (Table 4).

110 Although we did not conduct a detailed examination of the Japanese catches of male sperm whales, we would note  
 111 that of 10,479 males caught between 1960 and 1971, almost all (10,433 or 99.6%) were reported as being of legal size.  
 112 The equivalent figures for the Soviet fleet for the same pre-IOS period were 8,655 (total) and 6,514 (males above 11.5  
 113 m). The difference between the two nation's catches is significant ( $\chi^2 = 170.4$ , df=1,  $p < 0.00001$ ). Thus, it is likely  
 114 that length data for males were also routinely falsified.

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 117 Table 1. Catches of female sperm whales in the Southern Hemisphere, by length, 1960-  
 118 1971. Japanese data are from the IWC database; Soviet data are from the factory fleet  
 119 *Yuri Dolgorukiy* (source: D. Tormosov).

Year	Japan Females			USSR Females		
	Total	>11.5m	%	Total	>11.5m	%
1960	6	6	100.0	57	1	1.8
1961	11	11	100.0	324	9	2.7
1962	362	361	99.7	588	14	2.4
1963	1850	1830	98.9	627	9	1.4
1964	2137	2114	98.9	790	19	2.4
1965	7	6	85.7	2093	33	1.6
1966	52	13	25.0	69	8	11.6
1967	0	0	-	353	5	1.4
1968	0	0	-	121	7	5.8
1969	137	132	96.4	19	4	21.1
1970	670	657	98.1	28	1	3.6
1971	567	556	98.1	467	43	9.2
Total	5799	5686	98.1	5536	153	2.8

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Table 2. Catches of female sperm whales in the Southern Hemisphere, by length, after implementation of the International Observer Scheme in 1972. Japanese data are from the IWC database; Soviet data are from the factory fleet *Yuri Dolgorukiy* (source: D. Tormosov).

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Year	Japan Females			USSR Females		
	Total	>11.5m	%	Total	>11.5m	%
1972	398	81	20.4	1388	106	7.6
1973	240	18	7.5	518	14	2.7
1974	498	29	5.8	1263	43	3.4
1975	159	9	5.7	984	8	0.8
1976	115	0	0			
1977	168	11	6.5			
1978	0	0	0			
1979	87	4	4.6			
Total	1665	152	9.1	4153	171	4.1

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Table 3. Length distribution of female sperm whales taken by Japan and the USSR in the Southern Hemisphere, 1960-1971.

Nation	< 11.1	11.1-11.5	11.6-12.0	12.1-12.5	12.6-13.0	13.1-13.5	>13.5	Total
Japan	97	16	5133	473	50	26	4	5799
USSR	5090	293	129	18	4	1	1	5536

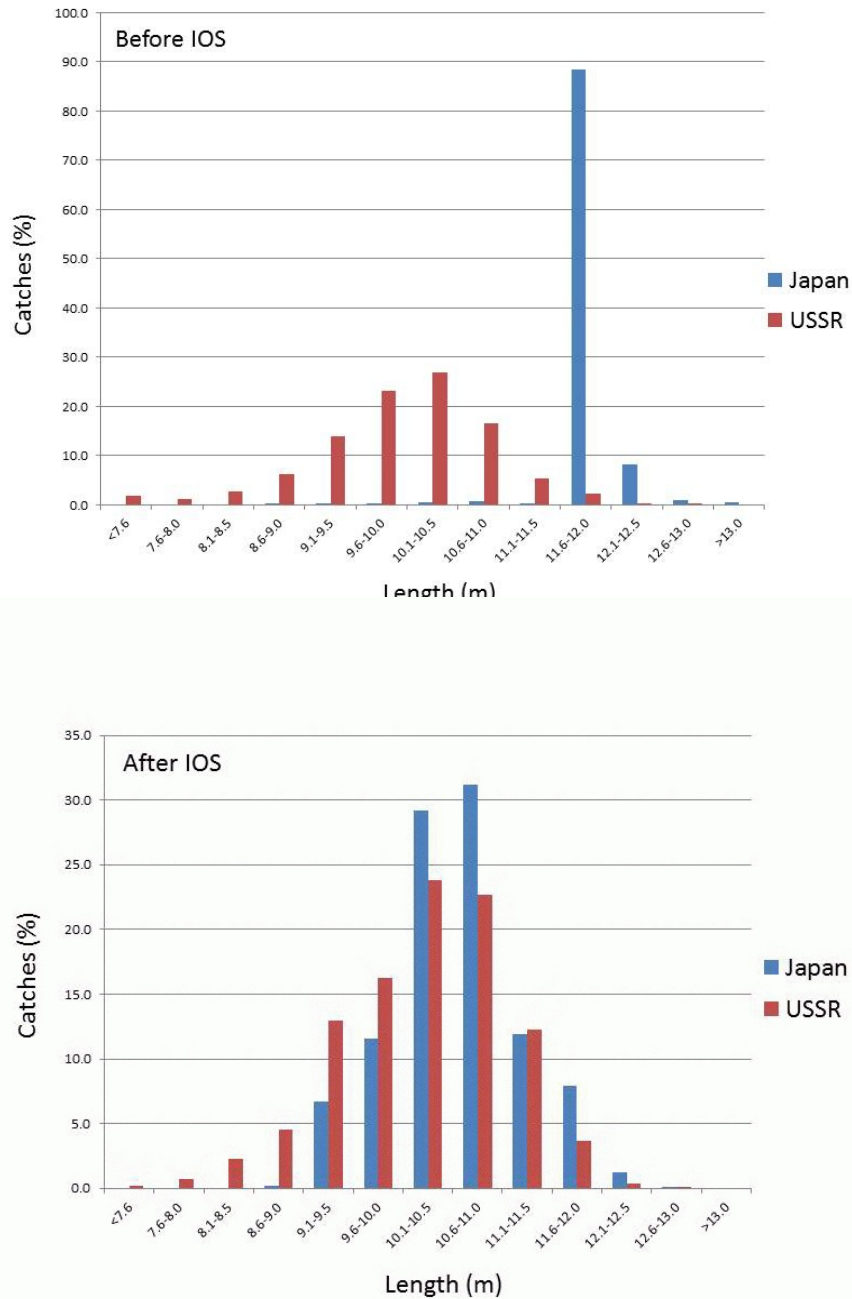
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Table 4. Length distribution of female sperm whales taken by Japan and the USSR in the Southern Hemisphere, after implementation of the International Observer Scheme in 1972.

Nation	< 11.0	11.0-11.5	11.6-12.0	12.1-12.5	12.6-13.0	> 13.0	Total
Japan	1125	388	131	20	1	0	1665
USSR	3321	661	155	15	1	0	4153

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Figure 1. Length distributions (percentage of total catch) of female sperm whales killed in the Southern Hemisphere by Japanese fleets and the USSR's factory fleet *Yuri Dolgorukiy*: 1960-1971 (above), and following implementation of the IWC's International Observer Scheme in 1972 (below).



## DISCUSSION

As was the case with the Japanese catch of sperm whales in the North Pacific (Ivashchenko and Clapham 2015), the present analysis highlights the implausibility of the length statistics for takes of this species in the Southern Hemisphere; indeed, the latter are even more unrealistic. Prior to implementation of the IOS, Japanese fleets were supposedly able to catch 37 times the number of legal-sized females as the Soviet fleet. The greatly skewed length distribution in the Japanese catch - with 88.5% of females reported as being within just 50 cm of the legal length (see Figure 1) - together with the high frequency of large females (relative to their occurrence in the Soviet catch), all indicate falsification of length data on an extensive scale. We did not incorporate catcher effort into the analysis, but while that would undoubtedly result in some minor changes to the figures reported here, the scale of the discrepancy between the Japanese and Soviet catch statistics is so large, and the length distribution so unrealistic, that it would make no difference to the conclusion.

Similarly, it is unlikely that the large differences in the frequency of LSFs could be explained by whale distribution. Both Japan and the USSR were hunting males in the Antarctic and males and females in lower latitudes, and there is no evidence that large females preferentially inhabit specific areas where they might have been disproportionately taken by the Japanese fleets.

Further evidence that illegal catches were being made lies in the fact that (as we predicted), the difference between the pre- and post-IOS Japanese figures for the percentage of females larger than 11.5 m was significantly different, with far fewer in the catch after 1971. Interestingly, there were actually significantly *more* large females in the Soviet post-IOS catch, although the absolute number remained small relative to the period before 1972. This is probably due to the fact that the presence of international observers prevented them from taking numerous whales smaller than 9.2 m (the new minimum size limit introduced in 1972) as they had done previously, thus increasing the relative percentage of large females in the overall catch.

The phenomenon of “stretching”, whereby an undersized whale’s reported length was increased, was well known throughout the whaling industry. Stretching was employed to avoid an infraction penalty in cases where an undersized animal’s length was misjudged by a harpooner. However, as in the North Pacific, the Southern Hemisphere data analyzed here clearly reflect more than the occasional accidental take, and indicate that the large catches made by Japan prior to the IOS involved the intentional taking of numerous under-sized whales. As noted above, the IWC itself was apparently aware that the minimum-length regulation was being routinely violated (IWC 1967).

That almost 100% of the males killed during the study period were also reported to be above the minimum size limit indicates that it was almost certainly not just females involved in the mis-reporting. Mature male sperm whales are much larger than females, but the family groups found in lower latitudes typically contain much smaller immature males. In all, 3,660 of the males in the Japanese catch were killed between 30° and 40° S, and all but 27 of these were reported as above 11.5 m. It is not credible that catcher boat gunners were so unerringly accurate in their visual assessments of a whale’s length as to ensure that virtually every sperm whale caught (whether male or female) was of legal size.

As noted in Ivashchenko and Clapham (2015), differing size selectivity between Japanese and Soviet whalers can be ruled out as an explanation for the large discrepancies in length statistics. Soviet whalers were required to meet often high production targets and thus actively sought out the largest animals because of their high production value (Ivashchenko *et al.* 2011). The *Yuri Dolgorukiy* length data are very similar to those of other Soviet fleets operating in the Southern Hemisphere. For example, during the 1962/63 whaling season, the *Sovetskaya Rossiya* fleet caught 163 female sperm whales, none of which measured above the minimum size limit (Ivashin *et al.* 1963). In other words, it was not that the Soviets ignored large females, but rather that they simply did not exist in the high numbers reported in the Japanese data.

It is not known whether the Japanese mis-reporting involved falsifying catch numbers as well as length statistics, or changes in the sex of the catch (as routinely occurred in Soviet reports to IWC as well as in the Japanese coastal fishery; Kasuya 1999, Kondo and Kasuya 2002, Ivashchenko *et al.* 2014). Whatever the case, the Japanese sperm whale catch statistics regarding length (and possibly also catch numbers) that are currently in the IWC Catch Database must be regarded as unreliable, and they should not be used in population assessments.

Given the widespread misreporting that is known to have occurred in both the land station and pelagic catch of this species in the North Pacific, and the suspicions raised within the IWC at the time, the Southern Hemisphere results

reported here are not surprising. Overall, however, the evidence of misreporting by Japan described here and elsewhere, together with the USSR's 30-year campaign of illegal whaling, underscores the past failure of the IWC to manage whale stocks and to effectively regulate whaling.

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