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WP SEA-46Not to be cited without prior reference
to the Marine Mammals Division,
Institute of Marine Research, Bergen.SUMMARY OF 1991 AERIAL AND VISUAL SURVEYS TO ESTIMATE HARP
SEAL PUP PRODUCTION IN THE GREENLAND SEA*Nils Øien, Institute of Marine Research, P.O.Box 1870 Nordnes, N-5024 Bergen, Norway*

Estimates of harp seal pup production based on visual counts from helicopter and photographic surveys from aircraft are presented by surveyed patches in *Øien and Øritsland* (1993). Four patches were identified during the surveys, but not all these patches were covered by a single method, and one patch (02) was covered by counts from the Russian vessel *Varzuga*. We know the estimate from that count, but not the associated uncertainty. No estimates of scattered pups (that is, outside the main patches) is presented. *Øien and Øritsland* (1993) provides information on reading errors during the interpretation of the photographic material. For two specific examples, the reading procedure adopted underestimates the true counts by 3.2% and 5.5%, taken together 8.9%. Since no associated variance estimates have been calculated, the photographic counts have not been corrected for these biases. The following table is an attempt at providing a summarising estimate as a basis for further discussions within the Working Group. Visual and photographic data have been used without any corrections; this should be remembered when interpreting the results. For each patch, available estimates have been combined by weighting of variances. The Russian estimate for patch 02 has no associated variance, and is thus contributing to the total estimate only. Coefficients of variation in parentheses.

Patch	Visual survey	Photographic counts	Combined
01	7,100 (0.075)	2,021 (0.128)	2,991 (0.078)
02	3,800 nil	nil	3,800 nil
03	nil	5,905 (0.195)	5,905 (0.195)
04	52,500 (0.159)	31,917 (0.271)	42,574 (0.141)
Total over all patches:			55,270 (0.141)
95% confidence interval:	44,500 - 68,500		

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Reference

Øien, N. and Øritsland, T. 1993. Aerial and visual surveys to estimate harp seal pup production in the Greenland Sea. *ICES C.M.1993/N:9*.