Using sparse survey data to investigate the declining abundance of British harbour seals
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This study presents an analysis of changes in the regional abundance of harbour seals (Phoca vitulina) based on repeated aerial surveys of haulouts, and demonstrates the use of sparse data to deliver advice about population status and management. Generalised linear models with negative binomial errors were used to represent these overdispersed data. The shape parameter of the negative binomial distribution was directly estimated from the data where this was possible. Information from time-series of counts where there were few gaps in the data was used to improve the estimation of this parameter in areas where fewer surveys had been carried out. The results show that the number of harbour seals in eastern England has not increased since the end of the 2002 phocine distemper epidemic. There is also evidence of a general decline in most of the large harbour seal colonies around Britain. The populations in the Inner Hebrides were an exception, with numbers appearing to be stable or increasing. Between 2001 and 2006, the population in Orkney and Shetland declined by 40% (95% confidence interval: 30–50%), indicating harbour seals in these areas experienced substantially increased mortality or very low recruitment over this period. The widespread declines, ranging from Shetland to The Wash, suggest that the causes may have been present over a large part of the North Sea.