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Estimating the abundance of long-lived, migratory animals is challenging but essential for managing populations. We provide the first abundance estimates of endangered humpback whales *Megaptera novaeangliae* from their breeding grounds in Oceania, South Pacific. Using fluke photo-identification (1999–2004, $n = 660$ individuals) and microsatellite genotypes (1999–2005, $n = 840$ individuals), we estimated abundance with open capture-recapture statistical models. Total Oceania abundance and trends were estimated from 4 primary and 5 secondary sampling sites across the region. Sex-specific genotype data enabled us to account for the difference in capturability of males and females, by doubling male-specific estimates of abundance derived from genotypes. Abundance estimates were congruent between primary- and secondary-region data sets, suggesting that the primary regions are representative of all Oceania. The best estimate of total abundance was 4329 whales (3345–5313) in 2005, from a sex-specific POPAN super-population model, which includes resident whales and those migrating through the surveyed areas. A doubled-male POPAN abundance estimate from 2003 ($n = 2941$, 95% CI = 1648–4234) was considered the most plausible for the 4 primary survey areas and was similar to the 2003 doubled-male estimate derived from Pradel capture probabilities ($n = 2952$, 95% CI = 2043–4325). Our results confirm that Oceania is the least abundant humpback whale breeding population in the southern hemisphere. Pradel models showed no significant trend in abundance, which contradicts the recovery seen in most other populations throughout the world. Thus we suggest that the whales in this area warrant continued study and management attention.