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Short and long-term population consequences of increased calf mortality in the southern right whales off Argentina

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During the last decade, southern right whale (Eubalaena australis) calves died in large numbers on their calving ground at Península Valdés, Argentina (606 calf deaths recorded since 2003). The proportion of two-year calving intervals (which result from calving failures) increased during this period. Normally, females give birth once every three years, spending one year pregnant, one year nursing, and one year recovering to support the next pregnancy. However, females that lose a calf early in lactation may recover quickly and conceive a second calf in one year rather than two; thus the frequencies of two-year intervals are expected to increase when perinatal (late-term fetus and neonatal calf) mortality increases. Four- and five- year calving intervals also occur occasionally and are thought to result from calving failures. Using data from annual aerial photographic surveys of the Valdés population, we determined the frequencies of directly observed 2-, 3-, 4- and 5-year intervals that began with a calving in 1971-2009. Two-year intervals constituted 3% of the total in years of relatively low calf mortality (1971-2002, 2004 and 2006), but 16% in years of high calf mortality (2003, 2005 and 2007-2009). A mathematical model of right-whale population dynamics was used to assess potential short- and longer-term effects of a sustained increase in calf deaths. In this model, the birth rate increases during the first eight years of increased perinatal mortality (roughly equivalent to 2005-13), because a female that loses a calf returns sooner than one that successfully weans a calf. The birth rate begins to decline later, when the female calves that died in high mortality years fail to enter the adult population. If elevated rates of calf mortality continue for another decade or two, the population's growth is expected to slow substantially