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POPULATION BIOLOGY

Population monitoring: what to count?

The population size of an otariid colony is difficult to estimate as individuals are constantly coming and going. The proportion present at a given time changes in a multitude of cycles, including long-term trends, the breeding chronology, seasons, prey availability, weather patterns, time of day, and lunar and tidal cycles. Young pups, however, are confined to the colony and the number of pups present provides a useful index of total population. Pups also are easily distinguished from other age classes and are produced during a defined breeding period.

A caution to using pup numbers to monitoring populations is that pups available to be counted fluctuate over time. Within a season, there is a high level of newborn pup mortality. At the Seal Rocks Australian fur seal colony during the 1970s, for example, Bob Warneke estimated that on average 15% of pups died in their first 2 months of life. Pup numbers present immediately after the pupping period differ from those available 1 month later. Pup numbers also change among years, even in a stable population. This is because fluctuations in prey availability influence both the proportion of females that can carry a pregnancy through to term and the survival of newborn pups. Large seas related to summer storms can cause high levels of pup mortality, particularly at low-lying colonies, in some years but not in others. Steve Kirkman, in assessing trends in pup production by Cape fur seals from a 40-year data set, concluded there had been little change in overall population despite the number of pups counted at individual colonies in consecutive years fluctuating by up to 50%. Long-term, routine counting of pups is the key to establishing an otariid's population status and trends. Whenever possible, monitoring at each colony should apply the same or comparable techniques, be conducted as soon as possible after the end of the pupping season and be repeated on about the same date across years.

The accuracy of pup counts depends on the number and movement of individuals present, the terrain and the counting method. Prior to the mid-20th century, numbers at sites in southern Australia were occasionally guessed, with figures like 'thousands'