

Guidelines for Monitoring of Australian sea lions

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The need to count pups on several occasions during the pupping season in an Australian sea lion colony and the need to count dead pups was demonstrated at both colonies where pup abundance was estimated as part of this study. Pup numbers during the pupping season at Dangerous Reef colony increased to a maximum four or five months after pupping began. Numbers then decreased, presumably as mothers moved away from the colony with their pups. At The Pages Islands in 1999/2000, the maximum number of pups was observed in mid-December, about four months after pupping began.

The pupping season of Australian sea lions extends for five or more months and some pups may leave the colony with their mothers before the pupping season has ended (Higgins and Gass 1993). Thus, a single count of pups is likely to underestimate the number of pups born in the colony.

A second problem with using counts of pups to estimate abundance is that dead pups need to be included. Inspection of the compilation of pup counts for many sea lion colonies in South Australia over many pupping seasons (Dennis 1999) indicates that dead pups were rarely included in the counts.

In order to improve the accuracy of estimating the number of pups born in a sea lion colony, we recommend the following guidelines from this project:

1. Pup carcasses from the previous season should be removed from the colony before pupping begins.
2. Once pupping begins, live pups from the previous season should be considered as juveniles.
3. Pups should be counted on several occasions during the pupping season, at about monthly intervals. Pup numbers increase to a maximum about five months after pupping begins and then decrease. Thus the most informative counts for determining the maximum number of pups in the colony are at four to five months after the pupping season begins.
4. It is advisable to determine when the first pups are born so that the timing of subsequent counts can be established. Referral to the predictions of breeding seasons for Australian sea lion colonies in South Australia prepared by T. Dennis should assist in predicting the timing of this event; the 'calendar' is presented by Shaughnessy and Dennis (1999, Figure 4).
5. Dead pups should be counted and included in the tally of pups on each visit to the colony. They should be marked with stock marker from a spray can or removed from the colony to ensure they are not re-counted on subsequent visits.
6. Live pups should be separated into two categories: 'brown pups' (that retain some of their natal coat) and 'moulted pups' (that have completed their moult). The estimate of pup numbers for the colony on a particular visit is then the sum of the three categories (brown, moulted and dead).
7. If live pups are not classed as 'brown' and 'moulted', they should be recorded as 'unclassified'.
8. The number of dead pups recorded at each visit should be added to the number recorded at previous visits to give the number of 'Accumulated dead pups'. When that number is added to the numbers of moulted, brown and dead pups recorded on a subsequent visit, it gives the best available estimate of pups born to date. The largest of the figures for these visits is then the best available estimate of pup production.
9. If the colony is visited after the maximum number of pups is recorded and if it is apparent that more pups have been born since then, the 'best' estimate of pup production can be improved by including them. Newborn pups can be distinguished by their small size, the presence of loose skin folds, their pale crown and their faint facial markings that give them a spectacled look (Ling 1992).
10. Pup mortality for the pupping season should be recorded as the number of dead pups counted in the seven months of the pupping season, that is until seven months from the birth of the first pup. Calculate the incidence of pup mortality as a percentage of the best available estimate of pups from paragraph 9 or 8.

References

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