This paper presents a new reconstruction of prehistoric population of Australia for the last 50ka, using the most comprehensive radiocarbon database currently available for the continent. The application of new techniques to manipulate radiocarbon data (including correction for taphonomic bias), gives greater reliability to the reconstructed population curve. This shows low populations through the late Pleistocene, before a slow step-wise increase in population beginning during the Holocene transition (approximately 12ka) and continuing in pulses (approximately 8.3 – 6.6ka, 4.4 – 3.7ka, and 1.6 – 0.4ka) through the Holocene. These data give no support for an early saturation of the continent, although the estimated population following initial landfall was probably greater than previously allowed (comparable with the early Holocene). The greatest increase in population occurred in the late Holocene, but in contrast to existing intensification models, changes in demography and diversification of economic activities began much earlier. Some demographic changes appear to be in response to major climatic events, most notably during the Last Glacial Maximum, where the curve suggests that population fell by about 60% between 21 – 18ka. An application of statistical demographic methods to Australian ethnographic and genetic data suggests a founding group of 1,000-2,000 at 50ka would result in a population high of approximately 1.2 million at 0.5ka. Data suggests an 8% decline to approximately 770,000 – 1.1 million at the time of European Contact, giving a figure consistent with ethnographic estimates and with historical observations of the impact of smallpox and other diseases introduced by Macassans and Europeans during and after AD 1798.