

---

## **\*\*VARIATION IN BIRTH MASS AND MASS GAIN DURING LACTATION FOR A LONG-LIVED MAMMAL: A CASE STUDY USING THE WEDDELL SEAL**

J. Terrill Paterson\*, Ecology Department, Montana State University, Bozeman  
Jay J. Rotella, Ecology Department, Montana State University, Bozeman  
Robert A. Garrott, Ecology Department, Montana State University, Bozeman

Reproduction in mammals is costly, with implications for trade-offs between current reproduction and survival. Life history theory suggests the amount of energy allocated to reproduction should change as a function of increasing maternal age, and empirical work supports both within-individual decreases (consistent with senescence) and increases (consistent with constraint and restraint). The Weddell seal (*Leptonychotes weddellii*) is an ideal organism with which to study patterns of maternal energy allocation due to the life history. Here, we used a long-term mark-recapture database of individually marked mothers and pups in Erebus Bay, Antarctica, to develop a stratified sample of masses from pups and known-age females across maternal ages in 11 different years. Hierarchical modeling of potential sources of variation in: 1) pup masses at parturition, 2) pup mass gains from parturition to mid-lactation (~20 days), and 3) pup mass gains from mid-lactation to late-lactation (~20-days to ~35-days) was used to 1) evaluate the relative support for increases/decreases in reproductive allocation as a function of maternal age, 2) assess how patterns of

reproductive allocation may reflect pre-parturition resource acquisition and/or post-parturition resource allocation, and 3) estimate the magnitude of individual heterogeneity in maternal effects after accounting for maternal and offspring characteristics. Our results provide strong evidence that reproductive investment at parturition and pup mass gains from parturition through late-lactation vary with maternal age and breeding history and result in important differences in late-lactation pup masses. Such variation may have consequences for the early-life success of offspring, and thus implications at the population level.