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Unifying quantitative life-history theory and field endocrinology to assess prudent parenthood in a long-lived seabird

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ABSTRACT

Question: Can field measurements of stress hormones help us to assess the prudent parent hypothesis in a long-lived seabird?

Organism: Black-legged kittiwake, *Rissa tridactyla*.

Location: Duck and Gull Islands, Cook Inlet, Alaska, USA.

Methods: We examined the statistical relationship between the stress hormone corticosterone and mortality in black-legged kittiwakes. We built a demographic model of the kittiwake life cycle to determine whether the mortality rates associated with persisting in a breeding attempt despite high corticosterone caused the birds to sacrifice more lifetime reproductive output than they gain from one year's breeding.

Results: The probability of apparent mortality increased with corticosterone, suggesting some birds incurred increased mortality risk for the sake of breeding. For Duck Island (low reproductive success), it appears birds sacrificed more lifetime reproductive success than a prudent parent would. On Gull Island, it appears most but possibly not all birds were behaving in ways consistent with theory, although definitive statements require larger samples of highly stressed birds.

Keywords: black-legged kittiwake, CORT-fitness hypothesis, corticosterone, endocrinology, life history, prudent parent.

INTRODUCTION

Skipping of reproductive events is frequently observed in long-lived birds (Cam *et al.*, 1998). The 'prudent parent hypothesis' posits that skipping occurs when the costs of breeding reduce expected lifetime reproduction by more than the value of the current brood (Drent and Daan,

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