PRBO Conservation Science
Publication Brief

Release:	***Contact***:	***Phone***:	***E-mail***:
June 21, 2011	*Grant Ballard*	*(707) 781-2555*	*gballard@prbo.org*

www.prbo.org

Non-consumptive factors affecting foraging patterns in Antarctic penguins: a review and synthesis

For several species it has been shown that habitat-use balances predation risk and foraging success. Younger individuals or those in poor body condition take risks by opting for habitats where food is more available but top predators are more abundant as well (and vice versa for individuals in good condition). This has rarely been demonstrated in the marine environment. A lack of full appreciation of these effects can make it difficult to understand why animals sometimes avoid seemingly ideal habitat (or select seemingly less-than-ideal habitat), and has implications to our ability to accurately predict shifts in species distributions and foraging or migratory behavior that are also affected by environmental change.

In a paper published in *Polar Biology*, Grant Ballard of PRBO teamed up with David Ainley of H.T. Harvey and Associates to review previous studies and conduct new analyses of foraging behavior to assess the extent to which Adélie and Emperor penguin behavior and life history patterns can be explained in the context of risk aversion (or "fear of being eaten"), as opposed to simply "going where the food goes."

The study shows that although the penguins can forage successfully in dark conditions, such as those found deep under the Antarctic sea ice, penguins do not enter or leave the water at night. During these transitions they are most susceptible to predation, which is a pattern that may be analogous to behavior during state transitions in other species, such as leaving or returning to a songbird nest or an island colony. Results also offer clues to why Emperors and Adélies both make seemingly unnecessarily long trips during dispersal and migration, often passing by areas with large food aggregations that would usually be predicted to offer ideal foraging opportunities. Such non-consumptive, behavioral aspects of species interactions have yet to be considered as important in Southern Ocean or other marine food webs.

The study benefited from support by the National Science Foundation, grant OPP 0440643.

Main Points

- Adélie and Emperor penguins can forage successfully in the very dark conditions found at depth, yet do not enter or leave the water in the dark of night, potentially due to fear of being eaten.
- This could also explain why the penguins often avoid areas of apparently high habitat suitability or prey availability during their long distance dispersal or migration.
- Global climate change is forcing penguins to continue to adjust their behavior to avoid new predation risks while still locating enough of their own food.

Paper citation:
Ainley, D.G. and G. Ballard. 2011. Non-consumptive factors affecting foraging patterns in Antarctic penguins: a review and synthesis. Polar Biology DOI 10.1007/s00300-011-1042-x.