

 <p>Agreement on the Conservation of Albatrosses and Petrels</p>	<p><b>Fourth Meeting of the Population and Conservation Status Working Group</b></p> <p><i>Wellington, New Zealand, 7 – 8 September 2017</i></p> <p><b>Using the unique spectral signature of guano to identify unknown seabird colonies</b></p> <p><b><i>Peter T. Fretwell, Richard A. Phillips, Michael de L. Brooke, Andrew H. Fleming and Alasdair MacArthur</i></b></p>
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### SUMMARY

Despite the threats faced by seabirds in both terrestrial and marine habitats, even basic knowledge of the locations of colonies, population sizes and trends is lacking for many remote areas of the world. Recent studies have shown that the guano of Adélie penguins can be identified from Landsat Enhanced Thematic Mapper (ETM) imagery and used to map colonies on coasts around continental Antarctica. Our study highlights a new technique based on the unique spectral signature of guano that can be used to discriminate seabird colonies from background geology and vegetation in a wider range of natural environments, including the vegetated and zoologically-diverse region of the Antarctic Peninsula; moreover, the method was effective for all densely colonial, surface-nesting seabirds. Using Landsat ETM imagery, we correctly identified all known seabird colonies of over 50 pairs in the area of Marguerite Bay. Almost all other areas with a similar spectral signature that were outside known breeding areas were single pixels that were readily distinguishable from genuine colonies. If these were excluded, only 4.1% of pixels appeared to represent unknown breeding or roosting sites, and warrant further investigation. The spatial extent of the guano provided a general guide to the number of individuals present, but further work would be required to determine the accuracy of this method for estimating population size. Spectral profiles of guano collected by satellite and hand-held spectrometers were compared with available data in spectral libraries and did not match with any known geological profile. There may also be potential for discriminating colonies of different species that differ in phenology and show seasonal changes in diet by the carefully-timed acquisition of suitable satellite imagery. We conclude that the remotely-sensed guano signature is a good indicator of the location of seabird breeding or roosting sites, with potentially wide application to other areas of the world.

This paper has an attachment:

Fretwell PT, Phillips RA, Brooke MdL, Fleming AH, McArthur A Using the unique spectral signature of guano to identify unknown seabird colonies. *Remote Sensing of Environment* **156**, 448-456. <https://doi.org/10.1016/j.rse.2014.10.011>