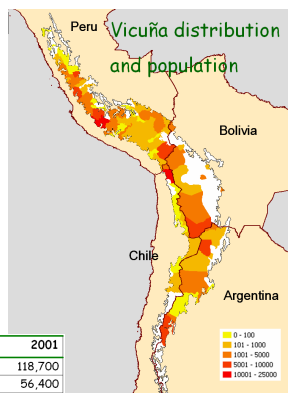
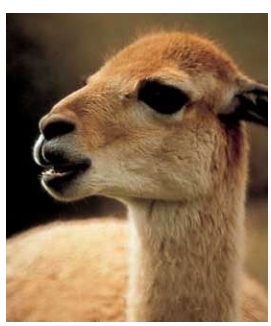




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Introduction

The vicuña is one of the success stories of international conservation. Having recovered from near extinction, the species is now locally abundant, and there is increasing interest to exploit its highly prized fleece. Many communities now see the vicuña as an important actual or potential source of income, alongside their traditional livestock – llamas, alpacas and sheep.



	1969	1981	1997	2001
Peru	10,000	61,900	102,800	118,700
Bolivia	3,000	4,500	33,800	56,400
Argentina	1,000	8,200	22,100	33,500
Chile	500	8,000	19,800	16,900
Ecuador	0	0	1,600	2,000
Total	14,500	82,600	180,100	227,500

Left: Changes in total population of vicuñas during the period of conservation. Above: Distribution of vicuña in 1997.

Background

Behavioural observations suggest that the vicuña is territorial and that family groups of males with breeding females are sedentary. However, a 30-year regular census indicates considerable spatial heterogeneity in the observed changes in vicuña population within the study area (5752 km²), consistent with extensive movements of family groups avoiding locally adverse habitats. To test this theory, data from the SPOT-VEGETATION 1km² programme was used to evaluate change in the amount of green matter during a six-year period from April 1998-April 2004.

Objective

To identify spatial differences in habitat and assess the extent of temporal variability in green herbage availability to vicuñas in the Chilean altiplano.

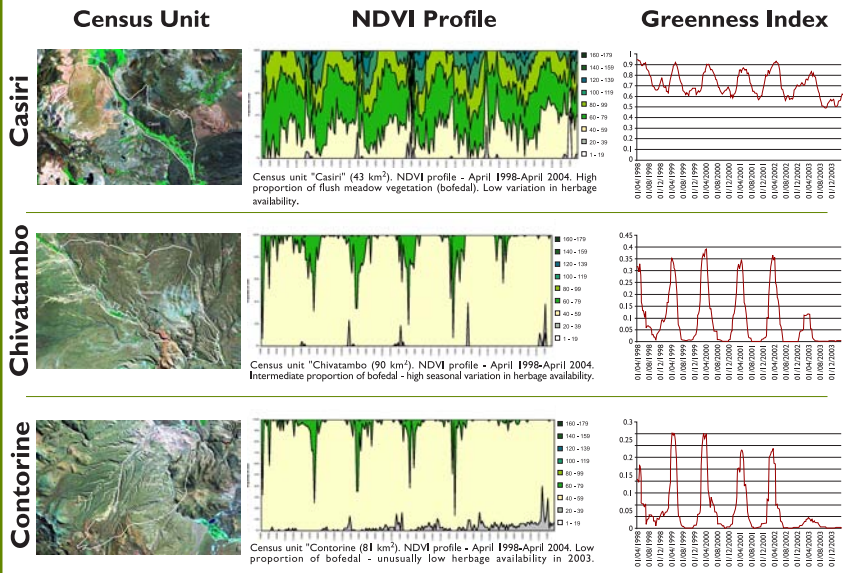
Methods

Local NDVI images of the study area were sampled from the SPOT-Vegetation South America 1km² dataset. Reflectance profiles for each of the 32 study sites were isolated. A mean NDVI reflectance of -0.53 was chosen as an indicator of the green component of land cover, and used to derive an index of "greenness" that may be proportional to the available grazing resource.



A series of vegetation transects established the species composition and ground cover at known reference points.

Results



Discussion

The most extensive vegetation types in the Chilean altiplano are tussock grass steppe (*Festuca orthophylla*, *Deyeuxia nardifolia*), and xerophytic shrub vegetation (*tola*) of *Parastrephia* spp. The most productive landscape elements are the wet flush meadows (*Oxychloe andina*-*Werneria pygmaea*). All three of these elements are perennial, producing new shoots and leaves in response to increasing rainfall and temperatures in the summer months of January-March. The time series of images shows the "green wave" of vegetation growth responding to summer rains, and this can be used to characterise the vegetation as a resource for vicuñas. Remote sensing effectively demonstrates relative differences in land cover NDVI reflectance between vicuña census units. The greenness index is a useful tool as an indicator of temporal variation in habitat quality and will be used to identify resource "bottlenecks", spatial variation in habitat quality, and long term change in forage availability in this arid environment.

