

The Andean mountain cat (*Oreailurus jacobita*) in the central Andes: an attempt of status assessment by field interviews.

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Very few is known about the Andean mountain cat in the Andes. I was able to conduct a preliminary survey in July 1998 in several protected areas in Chile and Bolivia. Here are the results. The information gathered on its repartition provides basis for further research.

INTRODUCTION

The Andean mountain cat (*Oreailurus jacobita*) is one of the least poorly known felid species in the world (Nowell & Jackson, 1996). Only few specimens are available in museums, often with unprecise locations. It was first described in the genus *Felis* (Cornalia, 1865) and placed later in the newly created genus *Oreailurus* (Cabrera, 1940). In 1973, Kuhn found on the basis of the study of a single skull that a distinctive character was the respective size of tympanic bullae chambers, the anterior being larger than the posterior. A recent genetic study based on museum pelts has shown this cat to belong to the ocelot lineage (Johnson et al., 1998). Observations made in the wild are very scarce. In 1980, two biologists made a first detailed observation and were able to follow a cat for two hours in Huaca Huasi, Tucuman, Argentina (Scrocchy & Halloy, 1986). Few years after, a German photographer observed a cat stalking viscachas on the western shore of the Salar de Surire in northern Chile (Ziesler, 1992 & *pers. com.*). Recently there has been an increased interest concerning this cat with several projects setting up (Jackson, *pers. com.*).

STUDY AREA

From 11 July to 1 August 1998, I travelled in the Chilean and Bolivian Andes in an attempt to learn more about this mysterious cat.

Travels by 4x4 covered 3.000 km at an altitude ranging from 2.400 to 5.000 m. Average temperatures encountered were 10°C during the day and -20°C during the night. Weather was almost sunny and windy. In Chile I visited all the Region I protected areas: Lauca National Park, Las Vicuñas National Reserve, Salar de Surire Natural Monument and Volcan Isluga National Park and, in Region II, the future Licancabur-Tatio National Park. It was not possible to visit the Los Flamencos National Reserve but information concerning this protected area was collected in San Pedro de Atacama. In Bolivia, several days were spent in the very large Eduardo Avaroa Andean Fauna National Reserve in south-west Potosi province and around the Salar de Uyuni area.

Landscape and landuse can be quite different from a place to another in the central Andes. In Chilean region I, landscape is a dense Andean steppe (called puna) with several wetland areas (bofedales). Traditionnal villages breed lama herds which graze close to vicunas. There are some mining activities (Borax mine between Las Vicuñas National Reserve and Salar de Surire Natural Monument) which results in an intense truck traffic on the only suitable road crossing the area. The protected areas are managed by the Corporación Nacional Forestal (CONAF) which is the Chilean wildlife service. When going south to the region II, the climate becomes drier and colder which results in a steppe with fewer vegetation and some desert areas.

Name	UTM location	Altitude (m)	Area (ha)	Creation date	IUCN criteria
Chile					
Lauca National Park	18° 11' S; 69° 13' W	4.300	137.883	1965	II
Las Vicuñas National Reserve	18° 16' S; 69° 27' W	4.300	209.131	1983	IV
Salar de Surire Natural Monument	18° 52' S; 69° 05' W	4.200	11.298	1983	III
Volcan Isluga National Park	19° 10' S; 68° 50' W	4.800	174.774	1967	II
Licancabur-Tatio National Park	22° 42' S; 64° 53' W	4.300	-	project	II
Los Flamencos National Reserve	23° 00' S; 67° 18' W	4.300	73.986	1990	IV
Bolivia					
Eduardo Avaroa Andean Fauna National Reserve	22° 31' S; 67° 26' W	4.400	714.000	1973	IV

Table 1: Protected areas visited (WCMC protected areas information service).

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Traditional human presence is low but mining activities are well developed (sulphur mines) and are allowed inside protected areas. The south-west Bolivia region, usually called Sud Lipez, was the most extreme area visited. People reported temperature reaching -35°C during strong blizzards. Vegetation is rare and some large areas are completely free of life. Climatic conditions makes human presence very low with only a handful of tiny villages or isolated mining camps. During my visit, there was gold prospection inside the reserve.

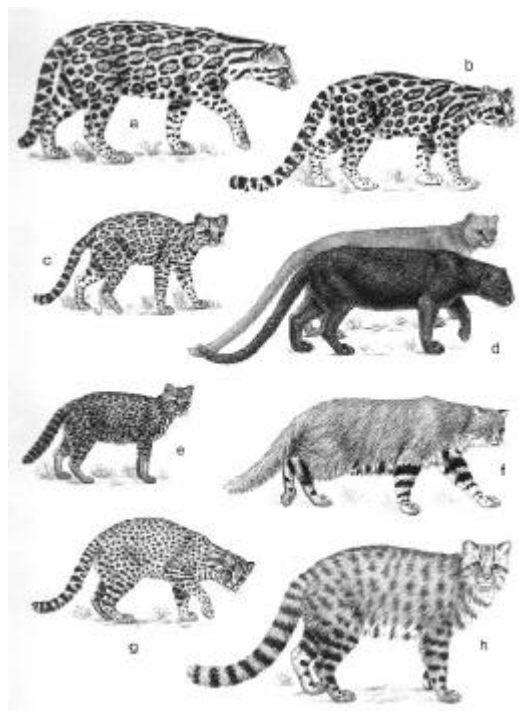


Fig. 1: Plate (from Redford & Eisenberg, 1992).

METHODS

The study was based on numerous interviews conducted in a planned systematic manner. This has proven to be invaluable when searching for rare or elusive animals (Schaller & al., 1996). If Andean mountain cats have been present for a long time, local people are likely to have seen them or their signs.

Moreover, interview results, when being compared to long term field technique ones, have shown to be a reliable method in estimating carnivore density, although it's important to avoid bias and to collect as much data as possible (Creel & Creel, 1995; Gros & al., 1996). People were asked to report any knowledge they had on cat species present in the area, especially if they saw one. If a positive answer was got, more details were asked, such as fur patterns, size, behaviour, time and place of encounter.

A special care was taken to get a full description of the tail because the Andean mountain cat tail is very distinctive (long with several black rings) from the pampas cat (*Felis pajeros*) tail, sympatric in the region. Finally, people were shown plates with several species of South American felids (Fig. 1) and asked to identify which animals they know or have seen. Plates included Andean felids and other ones that are not present in the region. This was used to test the reliability of the interviewer (Rabinowitz, 1993).

Traditional use of cat species for ceremonial purpose and other wildlife presence in the area were also documented. Maps from the Instituto Geografica Militar de Chile (1/250.000) and from the book Turistel'98 were used to record precisely locations. Language used was Spanish. An interpreter was used when necessary. Some Quechua questions had been prepared but weren't necessary. Interviewed people were tourist guides, local villagers, police and army staff, park rangers and refuge keepers. Whenever possible, market surveys and visits to traditional shops and residenciales were carried out to search for cat pelts.

RESULTS

During this expedition, 86 interviews were performed (41 in Chilean region I, 20 in Chilean region II and 25 in South West Bolivia). Results are given in Table 2. N is the number of interviews per protected area and n is the number of interviews when the respondent found the Andean mountain cat on the plates and was able to give enough details about its presence in the area and about its difference with the pampas cat. The ratio n/N may be seen as an indicator of Andean mountain cat presence in the area visited.

Chilean Region I

Local people, especially CONAF rangers, are well aware of the existence of both Andean mountain cat and pampas cat and they are able to differentiate them with tail patterns. In the Aymara language the Andean cat is called «Titi» and is believed to give bad luck when a man sees it and has then to be killed immediately. Therefore, it's not unusual that cats are killed but no evidence of a commercial use of this species was noticed. The highest cat density appears to be in the Lauca National Park, especially in the areas of Nevados de Putre and Laguna Cotacotani as stated by several CONAF rangers. Sometimes cats are also seen around the Salar de Surire, but are reported to be more common on the Bolivian side.

Area	N	n	n/N
Lauca National Park	9	5	55.6 %
Las Vicuñas National Reserve	12	7	58.3 %
Salar de Surire Natural Monument	11	5	45.5 %
Volcan Isluga National Park	9	4	44.4 %
Licancabur-Tatio National Park	10	2	20.0 %
Los Flamencos National Reserve	10	0	0.0 %
Eduardo Avaroa Andean Fauna National Reserve	16	3	18.8 %
Salar de Uyuni area	9	1	11.1 %

Table 2: Presence estimation of Andean mountain cats

Chilean Region II

As the traditional population is smaller, interviews were mostly based on people working with touristic activities. Andean mountain cats are believed to be scarcely present along the Bolivian borders according to tourist guides and one worker from a geothermal project stated to have seen, at 4,300 m, an Andean mountain cat crossing a road at midnight. He correctly described the cat and found it on the plates. No positive interviews were recorded for the Los Flamencos National Reserve.

South-west Bolivia

The most reliable interview came from a touristic driver who knew this cat and who encountered one at night on the road from Laguna Colorada to Uyuni in a place called « Valle de las roccas ». He stated that the cat was very rare and can be seen only during the night.



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Fig. 2: Entry of the Eduardo Avaroa Andean Fauna National Reserve in Bolivia, 4,800 m.

In the Eduardo Avaroa Andean Wildlife National Reserve, the cat was unknown in the immediate surroundings of Laguna Colorada and Laguna Verde but rangers stated that the species was present at low densities around the village of Queteña. On the Incahuasi island on the Salar de Surire, the local refuge keeper had noticed that the island hosts a population of cats which ranges from one island to another. He didn't recognize the Andean mountain cat on the plate and reported the species has two color phases. I was shown a stuffed specimen of this cat and photos have been identified as a pampas cat by Peter Jackson and Stephan Halloy.

Nevertheless, this opens new perspectives in understanding the ecology of the pampas cat as few species are present on the island (no other carnivore) and the islands of the archipelagos are isolated by water during summer rainy season.

Presence estimation:

Although the number of interviews performed is low, these results make possible a general overview of cat presence in the area surveyed. If the ratio n/N is considered (Table 2) and protected areas dispatched into four categories, it appears that cat apparent presence decreases when going south. In the first group of ratio ($50 \leq n/N$), we found Lauca National Park and Las Vicuñas National Reserve. Salar de Surire Natural Monument and Volcan Isluga National Park are in the second category ($40 \leq n/N < 50$). All the previous protected areas show the same habitat characteristics and belong to the Chilean region I. In the third category ($20 \leq n/N < 40$), there is Licancabur-Tatio National Park. South-west Bolivia and Los Flamencos National Reserve show the lowest apparent ratio ($n/N < 20$).

In an attempt to differentiate people who were highly aware of the cat from those who were vaguer, interviews were given a quality score. I followed the method presented in Gros, 1998. The quality score consists of three points corresponding to the reliability of the respondent: one point for the quantity of details provided, one point when no contradiction was recorded during the interview and one point when the respondent was interested in participating in the survey. Only Andean mountain cat positive results were considered in this analysis. In the Table 3, i is the point quantity given to an interview and n_i is the number of interviews with i points. $\sum i.n_i$ allows evaluating the global quality of Andean mountain cat positive interviews. $\sum i.n_i/N$ may be considered as an interview quality-linked indicator of Andean mountain cat presence for a protected area.

DISCUSSION

Attempting to assess an elusive cat status with field interviews is limited by the nature of the method itself. Except park rangers, people interviewed are usually not used to observe wildlife and are more concerned with their own life than with wildlife present in the area. If bias are not carefully avoided, people give easily the « good » answer for each question, simply to satisfy the biologist quest. Results suggest several observations. The representativity of respondents can not be assessed regarding their knowledge of wildlife.

Area	n_0	n_1	n_2	n_3	$\hat{a}i.n_i$	$\hat{a}i.n_i / N$
Lauca National Park		1	1	3	12	13.0 %
Las Vicuñas National Reserve			5	2	16	13.0 %
Salar de Surire Natural Monument		2	1	2	10	9.0 %
Volcan Isluga National Park		2	2	1	9	10.0 %
Licancabur-Tatio National Park	1	1			2	2.0 %
Los Flamencos National Reserve					0	0.0 %
Eduardo Avaroa Andean Fauna National Reserve		3		1	6	3.8 %
Salar de Uyuni area			1		2	2.2 %

Table 3: Quality-linked presence estimation of Andean mountain cats.

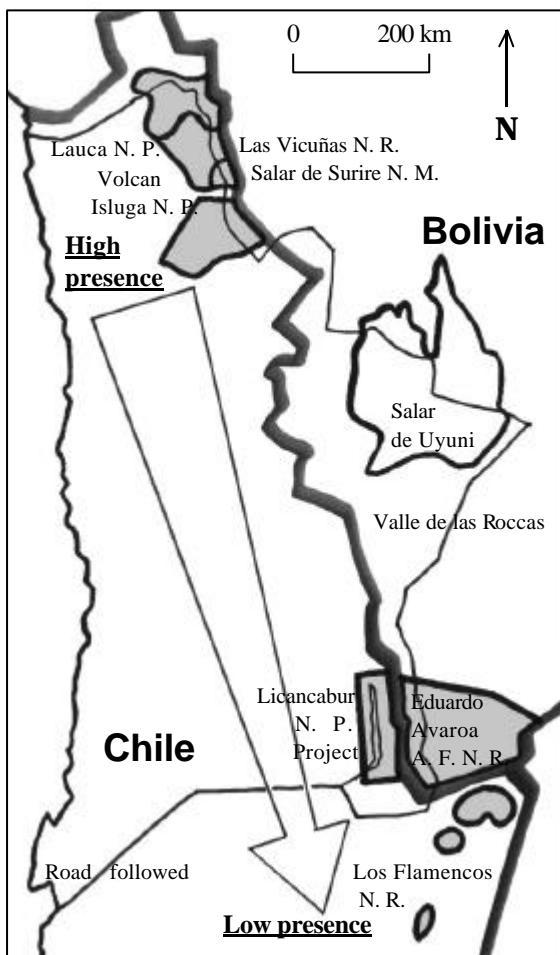


Fig. 3: Map of the area surveyed with presence indicator

For each site, no more than 16 interviews were performed and one false answer for ten interviews gives a 10% error. The ratios n/N and $\sum i.n_i/N$ must so be used with the greatest care. However, when considering a species on which almost nothing is known, interviews can be a cheap tool that gives the possibility to have a general view of the animal status.

This expedition has shown the Andean mountain cat to be possibly present in several sites, enough to be widely known by local populations in northern Chile. According to some rangers, it's not uncommon to see this species. Things appear to be different in region II and in South-west Bolivia given the low number of records in the future Licancabur-Tatio National Park and Eduardo Avaroa Andean Wildlife National Reserve. However these results mustn't be directly understood as a proof of low abundance of this cat. These areas are less populated, with only remote villages or mining camps. Moreover, the wildlife service is less important than in the Chilean region I. Large areas remain uninhabited and are therefore impossible to survey with interviews. It seems that the lack of data, in the literature, concerning the cat can be attributed to the few quantity of research that has been carried out in this area. In general, the high Andes are biologically underexplored and their remoteness, altitude and climatic conditions can make working difficult. The assumptions that Andean mountain cat apparent rarity was due to chinchilla (*Chinchilla brevicaudata*) widespread extinction (Nowell & Jackson, 1996) might not described the reality as the highest cat records were found where chinchillas are totally absent (Galaz, pers. com.). It's stressing to note that when being asked about their knowledge of chinchilla, local people always answer that the species was extinct or never seen since a long time. The highest cat records were also found where vizcacha (*Lagidium*

viscacia), other rodent species, water-fowls and generally wildlife populations are the most abundant of the area surveyed. More research is needed to understand the ecology and establish the conservation status of this cat. The possible competition between Andean mountain cat and pampas cat must also be investigated. Tools for such research are now widely available such as radio-tracking for ecological study and camera-trapping for deeper presence / absence surveys.

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REFERENCES

- Cabrera, A. 1940. Notas sobre Carnívoros sudamericanos. *Notas Mus. La Plata V Zoología* 29: 1-22
- Cleer, S. & Cleer, N. M. 1995. Status of the African wild dogs in the Selous Game Reserve and Mikumi National Park. 31. IUCN / CSG. *Canid News* 3: 34-35.
- Cornalia, E. 1865. Descrizione di una nuova specie del genere Felis, *Felis jacobita* (Corn.). *Mem. Soc. Ital. Sci. natur.* Mainland, 1, 1-9
- Gros, P. M. 1998. Status of the cheetah *Acinonyx jubatus* in Kenya: a field interview assessment. *Biol. Conserv.* 85: 137-149.
- Gros, P. M., Kelly, M. & Caro, T. M. 1996. Estimating carnivore densities for conservation purposes: indirect methods compared to baseline demographic data. *Oikos* 77: 197-206.
- Johnson, W. E., Culver, M., Iriarte A. J. & O'Brien, S. J. 1998. Tracking the evolution of the elusive Andean mountain cat (*Oreailurus jacobita*) from mitochondrial DNA. *Journal of Heredity* (in press).
- Kuhn, H. J. 1973. Zur Kenntnis der Andenkatze *Felis (Oreailurus) jacobita* Cornalia 1865. *Saugetierkundliche Mitt.* 21 : 359-364.
- Nowell, K. & Jackson, P. 1996. *Wild cats: status survey and conservation action plan.* IUCN, Gland, Switzerland.
- Rabinowitz, R. A. 1993. *Wildlife field research and conservation training manual.* Wildlife Conservation Society.
- Redford, K. H. & Eisenberg, J. F. 1992. *Mammals of the Neotropics, the southern cone, Vol 2.* University Chicago Press.
- Schaller, G. B., Liu, W. & Wang, X. 1996. Status of Tibet red deer. *Oryx* 30 (4) : 269-274.
- Scrocchi, G. H. & Halloy, S. P. 1986. Notas sistematicas, ecologicas y biogeograficas sobre el gato andino, *Felis jacobita*, Cornalia, *Acta Zool. Lilloana* 38 : 157-170.
- Ziesler, G. 1992. Souvenir d'un Chat des Andes, *Animan* 35: 68-79