Human-Puma Conflicts in Three Areas from the Southern Cone of South America: Preliminary Data

Mauro Lucherini[1,2], Leonardo Ríos[3], Claudia Manfredi[1,2], María José Merino[1] and Julia Arellano[1,2]

Of the two large species of felids occurring in the Neotropical Region, the puma *Puma concolor* is by far the most widespread and common. Nevertheless, its populations are declining in many areas and hunting is one of the most frequent causes of this decrease. This paper presents the preliminary results of an interview-based assessment of human-puma conflicts in three areas of Argentina and Chile located in very different ecoregions.

Conflicts between people and felids pose a significant threat to the survival of many carnivore species. In order to plan effective conservation/management strategies, the understanding of the dynamics of human-felid conflicts is necessary. This is especially true for large cats, which can prey upon livestock and are frequently the target of retaliatory killing (Kruuk 2002).

Interviews to local stakeholders have been largely used to analyze human-carnivore conflicts (e.g. Bagchi & Mishra 2006; Conforti & Azevedo, 2003; Romañach *et al*. 2007). We personally interviewed 234 inhabitants of three regions (Table 1): the rural areas of Villarrica (Araucanía Region, southern Chile), the surroundings of the Laguna de Chasicó Provincial Park (Buenos Aires Province, central Argentina), and the Andes of northwestern Argentina (Provinces of Tucumán, Catamarca, Salta, and Jujuy; Fig. 1). Our questions (Table 1) aimed to explore local people's knowledge of the presence of pumas, and their perceived abundance, as well as study people perception of and attitude towards this large cat. In all areas, pumas are legally protected, but in some of the provinces of northwestern Argentina specific authorizations can be obtained to kill "problem" individuals. Livestock is a primary economic activity in the three areas, but in central Argentina agriculture is also important (Table 1).

In all areas, the great majority of respondents was aware of the presence of pumas (Table 1). However, opinions on their abundance varied. While pumas were considered very rare by only 11.8% of local villagers in northwestern Argentina, this proportion increased in our study areas in southern Chile and central Argentina (Table 1).

Fig. 1. Map showing the location of the three areas where local people perception and attitudes towards the puma were studied (dark grey elipses), and the distribution range of the puma (shaded area).

In spite of the fact that, on average, most people perceived pumas as pests (84.8%) for their impact on livestock, the image of these felids was comparatively less negative in central Argentina (Table 1).

Interestingly, the proportion of respondents who reported to hunt pumas was smaller than could be expected based on perceptions and ranged from 3.7% in Chile to a maximum of 37.8% in central Argentina (Table 1). Pumas are hunted (Fig. 2) with a variety of techniques, including leg-hold and box traps, firearms, and poison. Although this aspect has not been quantified, retaliation for predation on livestock appeared to be the main reason for puma killing.

The data reported here form part of three

Table 1. Ecoregion, type of livestock practice, sample size, and percentage of interviewees reporting the presence of pumas and for each type of answer to the questions we delivered to local people in three areas of Argentina and Chile.

	Villarrica, southern Chile	Laguna de Chasico, central Argentina	Northwestern Argentina
Ecoregion	Valdivian forest	Argentine Monte	Puna
Livestock practice	Small scale sheep, goat and cattle ranching	Large scale cattle ranching	Small to medium scale llama farming
N. of interviews	54	41	139
Interviewees reporting pumas	98.1	87.8	91.4
How common are pumas?			
Common	30.2	36.1	47.1
Uncommon	34.0	25.0	41.2
Very rare	35.8	38.9	11.8
Do you consider pumas as pests?			
Yes	64.8	53.7	93.3
No	5.6	19.5	5.6
Do not know	29.6	26.8	1.1
Do you hunt pumas?			
Yes	3.7	37.8	36
No	96.3	62.2	64

ongoing projects, two of them aiming to contribute to the conservation of small cats (the Soul of the Andes project on the Andean cat and the Ecology and Conservation of Four Sympatric Cat Species in the Argentinean Monte) and one specifically analyzing human-puma conflicts (in Chile) and are the fruit of a recent cooperation. For this reason only part of the information collected until the moment can be directly compared. Nevertheless, we are now making an effort to reduce differences in our interview forms and thus provide a helpful platform both for further research and the evaluation of conservation issues of pumas in South America.

Our first results prove the existence of human-puma conflicts in three areas differing largely in many aspects, among others the economic status and culture of local inhabitants, as well as the natural habitats and their degree of alterations by man. These differences may be of help to explain variations in perceptions and attitudes. It is obvious that conflicts are exacerbated when carnivore predation affects low-income communities that mainly rely on livestock ranching (Sillero-Zubiri & Laurenson 2001). This is the case of the High Andes of northern Argentina, where llamas are by far the main source of income and, in many cases, food, and our study region in southern Chile, where local people are too poor to build predator-proof enclosures and the killing by pumas of a few sheep or goats is a very important loss. Nevertheless, it is interesting that the highest incidence of puma hunting appears to occur in central Argentina, which is comparatively the richest site. Several factors may contribute to explain this unexpected result. In Chile, where law enforcement is generally more strict than in Argentina, 85% of the respondents reported that they where aware that the puma is protected by law, and this contributed to prevent them from retaliatory killing. However, in many cases (in Chile and northern Argentina), interviewees mentioned not hunting pumas for the difficulties that it implies and for lack of resources.

It is clear that, since these conflicts are affected by a number of factors, no common rule for their reduction exists, and that management plans have to be based on a clear knowledge of local realities (Treves & Karanth, 2003). It has been suggested that incentive/compensation programs may facilitate conflict mitigation (Mishra *et al*. 2003, Verdade & Campos, 2004). However, we suggest that, since low incomes can affect both positively and negatively the outcomes of human-puma conflicts, conservation measures based on economic incentives should always be accompanied by awareness raising campaigns. If we are to improve human perception of pumas, education is also useful to increase knowledge on the ecological role of pumas and to provide a more objective perception of the economic importance of losses due to carnivore predation, which frequently tend to be overestimated with respect to other sources of mortality (Graham *et al*. 2005).

Fig. 2. A stuffed skin of a puma killed by local people in the High Andes of northwestern Argentina. (Photo J. Reppucci – GECM).

Acknowledgements

We thank J Reppucci, M Benzaquim, N Caruso, P Costillo, D Birochio, and P Perovic for their help in data collection, as well as Dr. P Cattan A. Thanks are extended to all the local people who kindly donated their time to answer our questions, the Salva family for her full support and all agencies that granted authorizations. CM was supported by a postdoctoral scholarships from CONICET. Our project were funded by Whitley Fund for Nature, Wildlife Conservation Network, Darwin Initiative, BP Conservation Programme, Earthwatch Institute, Panthera/WCS Kaplan Awards Program, and SGCyT, UNS (PGI 24/123).

References

Bagchi B. and Mishra C. 2006. Living with large carnivores: Predation on livestock by the snow leopard (*Uncia uncia*). Journal of Zoology 268, 217-224.

Conforti V. A. and de Azevedo F. C. C. 2003. Local perceptions of jaguars (*Panthera onca*) and pumas (*Puma concolor*) in the Iguaçu National Park area, south Brazil. Biological Conservation 111, 215-221.

Graham K., Beckerman A. P. and Thirgood S. 2005. Human–predator–prey conflicts: ecological correlates, prey losses and patterns of management. Biological Conservation 122, 159–171.

Kruuk H. 2002. Hunter and Hunted - Relationships between carnivores and people. Press Syndicate of the University of Cambridge, Cambridge.

Mishra C., Allen P., McCarthy T., Madhusudan M. D., Bayarjargal A. and Prins H. H. T. 2003. The role of incentive programs in conserving the snow leopard. Conservation Biology 117, 1512–1520.

Romañach S. S., Lindsey P. A. and Woodroffe R. 2007. Determinants of attitudes towards predators in central Kenya and suggestions for increasing tolerance in livestock dominated landscapes. Oryx 41, 185-195.

Sillero-Zubiri C. and Laurenson M. K. 2001. Interactions between carnivores and local communities: conflict or co-existence? Pp. 282–312. In: Carnivore Conservation (Gittleman J. L., Funk S. M., Macdonald D. W. and Wayne R. K. eds). Cambridge University Press, Cambridge.

Treves A. and Karanth K. U. 2003. Human-carnivore conflict and perspectives on carnivore management worldwide. Conservation Biology 17, 1491-1499.

Verdade L. M. and Campos C. B. 2004. How much is a puma worth? Economic compensation as an alternative for the conflict between wildlife conservation and livestock production in Brazil. Biota Neotropica 4,1-4.

[1] Grupo de Ecología Comportamental de Mamíferos (GECM), Cát. Fisiología Animal, Depto. Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, Bahía Blanca, Argentina. <lucherinima@yahoo.com>

[2] CONICET

[3] Magíster en Áreas Silvestres y Conservación de la Naturaleza, Universidad de Chile, Santiago, Chile