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Cattle-based livelihoods, changes in the taskscape, and human–bear conflict in the Ecuadorian Andes

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ABSTRACT

Cattle-raising, especially for dairy, has expanded in the Ecuadorian Andes since the late 1990s as smallholding farmers have shifted their livelihood activities away from crop-based agriculture due to changes in climate, market conditions, and rural out-migration. Non-migrants constructing cattle-based livelihoods are turning to cattle as the basis for "viable" livelihoods in order to remain in depopulating rural parishes. Non-migrant farmers express ideals such as autonomy and tranquility as reasons for their attachment to rural places. In turn, their livelihood activities remake these places materially. Drawing on Tim Ingold's conceptualization of taskscape and landscape, I argue that cattle-based livelihoods create a *taskscape* prone to human–wildlife conflict. Since 2009, residents have reported dozens of Andean bear attacks on cattle. Cattle are vulnerable capital assets. They represent both an investment with daily and weekly dividends over many years, in the form of milk, and a long-term form of wealth storage. The turn to cattle-based livelihoods in this region has thus heightened human–bear conflict. The phenomenon of the human–bear conflict is therefore a product of shifting livelihoods and accompanying changes in the taskscape. This analysis demonstrates the importance of listening to narratives of place attachment and accounting for the cultural logics of livelihood choices when considering interventions to address human–wildlife conflict.

1. Introduction

Cattle-based livelihoods, whether small-scale or as part of industrial operations, are widely understood to be ecologically destructive and related to deforestation and habitat loss (Rudel et al., 2009; Sayre, 2009). As such, cattle-raising is linked to human–wildlife conflict in general (Treves and Karanth, 2003) and human–bear conflict in particular (Goldstein et al., 2006).[1] Motives for such livelihoods, especially among smallholders in Latin America, have been debated in the literature, with studies explaining the "hamburger connection" (Hecht, 1993) or more recently, challenging the critical literature on perverse incentives to highlight the role of profits (Van Ausdal, 2009). The case detailed in this paper, that of smallholders in the northern Ecuadorian Andes raising cattle primarily for dairy, reveals the role of incentives that are not necessarily perverse, nor as explicitly connected to "First World consumption." These smallholders' narratives for why they raise cattle go beyond the purely economic. They wish to remain in the countryside despite widespread rural outmigration. However, the shift to cattle-based livelihoods from crops has not been without consequences. Between early 2009 and the summer of 2012 there were over 250 reports of Andean bear attacks on cattle on the eastern flank of the northern Ecuadorian Andes in the provinces of Imbabura and Carchi. This represents a dramatic increase from previous numbers both here and elsewhere in the country (Bland, 2013).[2] Some cattle owners pledged retribution, contributing to increased concern about humans, cattle, and Andean bears co-existing peacefully on the agricultural frontier. In this context, this research investigated: When, how, and under what conditions did raising cattle become

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[1] The "human–wildlife conflict" framing is problematic for ignoring nuance and complexity in human–animal relations, but is also pervasive throughout the conservation biology literature (Peterson et al., 2010). I have retained the language in order to speak to that literature. However, as Peterson et al. (2010) explain, almost all (>95%) of the 422 publications and presentations they reviewed that used the term human–wildlife conflict "referred to reports of animal damage to entities human care about."

[2] Studies of Andean bear attacks on cattle are relatively new, though incidents were reported as early as the middle of the 16th century (Castellanos et al., 2011). The first confirmed report of contemporary Andean bear attacks on cattle in Ecuador occurred in 1995 in a biological reserve on the western flank of the Andes near Quito. Since then, various clusters of incidents have occurred on the eastern flank of the Andes in the Consanga and Oyacachi watersheds in Napo province on the southern edge of the Cayambe-Coca Reserve, in the high Andean grasslands (páramo) of Carchi province, on the western slopes of the Andes in Pichincha province, and in the Chaco region also in Napo province (Castellanos, 2003; Castellanos et al., 2011; Flores et al., 2005). Most significant were the 41 events and 61 head of cattle lost in Oyacachi between 2001 and 2004 (Flores et al., 2005, 31).

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such a prevalent livelihood activity in the northern Ecuadorian Andes? What have been the consequences for interactions among humans, cattle, and Andean bears?

This study draws on theoretical insights from the literatures on livelihoods, taskscape and place-making, and cattle in geography, development studies, and anthropology to explain how cattle-raising has expanded since the late 1990s in Pimampiro, Ecuador, as smallholding farmers have shifted their livelihoods from crops to cattle due to changes in climate, market conditions, and rural out-migration. Further, cattle-based livelihoods serve an important social function; they are perceived as a "livelihood of last resort" and means for remaining in the countryside. An inductive human geography approach to a classic conservation problem revealed the importance of place-making to the "taskscape," or an array of work practices or livelihood activities, further detailed in Section 3.1 (Ingold, 1993). Place-making, or the ways in which people shape their experienced sense of where they live through discursive and material practices, is one important reason people choose to pursue certain livelihoods. In the context of widespread rural out-migration, non-migrants or "stayers" (Huijsmans, 2014) in this region have constructed cattle-based livelihoods in a form of individualized place-making. Yet although dairy farming allows people to stay in place in the context of broader political-economic drivers, it also leads to vulnerable cattle. Thus, this study also raises questions about what a "just" or "progressive" position on dairy farming and human–bear conflicts would be.

The argument unfolds as follows. First, I explain how theoretical understandings of livelihoods, the taskscape, and place-making reveal not only the intersection of the political-economic and the cultural, but also how place-making may involve processes of asset accumulation that create a taskscape ripe for human–bear conflict. Second, I turn to the case study of Pimampiro, where dairy production has emerged as a "viable" livelihood, allowing residents to remain in a place they frame as providing autonomy and tranquility. Third, I explain how this viable livelihood, resting on vulnerable cattle, contributes to negative consequences for interactions among people, their cattle, and Andean bears. Accordingly, policy interventions must consider not only the economic reasons for raising cattle, but also the cultural logic.

2. Study area and methodology

This qualitative, interview-based study focused on the cantón of Pimampiro, Ecuador both because it was the site of a particular concentration of bear attacks on cattle and was accessible to the researcher. The *cantón* Pimampiro is located on the eastern range (*cordillera*) of the Ecuadorian Andes about 100 road miles (4–5 h by bus) and 60 miles as the crow flies from the capital city, Quito, sixty miles south of the Ecuador-Colombian border, and immediately to the north of the million-acre Cayambe-Coca Ecological Reserve (see Fig. 1). The region is topographically, climatically, culturally, and economically diverse. Altitudes range from 1600 to 4000 meters above sea level, engendering four distinct vegetation types: lowland evergreen montane forest, cloud forest, high evergreen montane forest, and páramo (Echavarria, 2004).

Andean bears are some of the region's many inhabitants. Andean bears live in the Andes from Venezuela to Bolivia and have a wide altitudinal range from 200 to 4750 meters above sea level. No reliable estimates exist for their numbers and densities (Garshelis, 2011). The species overlapped with dense human populations in the Andes for thousands of years, but recent threats habitat loss and fragmentation, poaching, and the lack of knowledge about their distribution and status have made them vulnerable to extinction (Goldstein et al., 2008; García-Rangel, 2012). These three elements are interrelated in some cases, as habitat loss and fragmentation isolate bears and push them against the agricultural frontier, where interactions between bears and crops and livestock provoke retribution poaching.

A recent review by García-Rangel (2012, 108) aggregates the limited knowledge about Andean bears; despite research since the 1970s, "the species continues to be one of the least-known bears, and most of the information available is classified as 'grey' literature." However, diet is "one of the most extensively studied and better understood aspects of Andean bear ecology." Andean bears are omnivorous and opportunistic and eat seasonally, mainly eating fruits and leaves (frugivorous/folivorous) with bromeliads and palm trees as staple food sources. Despite a *mostly* vegetarian diet they are in the carnivore order (*Carnivora*), likely eat mountain tapirs (Castellanos, 2011b), and also "feed on domestic animals and occasionally raid crops" (García-Rangel, 2012, 96–97). Bears usually raid crops or livestock in isolated fields or those next to forest cover, away from human settlements. García-Rangel (2012, 109) asserts that controversies surrounding the issue "could be holding back attempts to tackle the impact that such consumption has had on conservation efforts," and closes her review recommending more research on multiple fronts, including livestock consumption.

Studies of Andean bear attacks on cattle are relatively new, though incidents have been reported as early as the middle of the 16th century. Reports of people hunting bears exist from the end of the 18th century, though no reasons were given, and in the 19th and 20th centuries, people accused bears of attacking their cattle and hunted them. In the 1970s, as oil-related development and extension of the agricultural frontier encroached on bear habitat, conflicts between humans and bears increased. The first confirmed report of contemporary bear attacks on cattle occurred in 1995 in a biological reserve on the western flank of the Andes near Quito. Since then, various isolated clusters of incidents have occurred on the eastern flank of the Andes in the Consanga and Oyacachi watersheds in Napo province on the southern edge of the Cayambe-Coca Reserve, in the high Andean grasslands (*páramo*) of Carchi province, on the western slopes of the Andes in Pichincha province, and in the Chaco region also in Napo province (see Fig. 1) (Castellanos, 2003; Castellanos et al., 2011; Flores et al., 2005). Since November 2009, an increased and unusual number of attacks on livestock were recorded in the northern Andes, with the cumulative number of attacks ranging from 87 as of 2011 (Castellanos et al., 2011) to 250 as of 2013 (Bland, 2013).

Rainfall can vary as widely as less than 500 mm per year in the urban center to 1300 mm per year, within 7 km (Preston, 1995, 549). Such significant variation in rainfall, temperature, and soil ecology influences the diversity of crops, which range from avocados and sugarcane at lower elevations to potatoes and broad beans at higher elevations. The town of Pimampiro has a long history as a commercial crossroads with tens of thousands of people living in the area in pre-Columbian times and was initially settled in modern times at the beginning of the 20th century. People cleared forest east and south of town and settled the rural parishes in two waves. The first of these waves in the early 1900s is described as primarily of indigenous people from elsewhere in the province. The second, in the 1930s, is described as primarily *mestizo* people from town and from the provinces of Carchi, Ecuador and Nariño, Colombia (Preston, 1995, 550; interviews).[3] Most came as economic

[3] Here, *indigenous* and *mestizo* are used as people self-identify in Ecuador, with mestizo referring to people of mixed colonial Spanish and indigenous descent. According to government statistics, the *cantón* of Pimampiro is currently primarily mestizo (77% mestizo, 14% indigenous, 4% Afro-Ecuadorian), and this study was conducted in a predominantly mestizo parish. However, this is an overly simplistic explanation and the social construction of race in Ecuador is far too complex to detail here. For a nuanced treatment of how *raza* functions in Ecuador and comparison with *race* in the US, see Roberts' (2012, 116–125) excellent ethnography. This paper specifically does not take up the question of "indigenous versus mestizo."