# A stakeholder analysis about jaguar (Panthera onca) conservation in central Brazil

Yennie Katarina Bredin

Norwegian University of Life Sciences
Department of Ecology and Natural Resource Management
Master Thesis 60 credits 2012

## FOREWORD

This study was undertaken as part of a larger research project on jaguar conservation and environmental justice financed by the Norwegian Research Council and led by the Norwegian Institute for Nature Research (NINA, Norway) Estación Biológica de Doñana (EBD-CSIC, Spain), the Jaguar Conservation Fund (JCF, Brazil), and in collaboration with the Norwegian University for Life Sciences (UMB, Norway). This paper constitutes the final work for my master degree in Tropical Ecology and Management of Natural Resources at UMB.

## ABSTRACT

A stakeholder analysis was conducted to study attitudes towards jaguar (*Panthera onca*) conservation in Brazil and identify areas of conflict and agreement between different stakeholder institutions. In my study I defined stakeholders as any institution that directly or indirectly influenced jaguars, were influenced by jaguars, or both. I limited the spatial scope of the study to the states of Goias and Mato Grosso, in central Brazil, and used Q methodology to explore which institutional actors grouped together and on what issues. The Q analysis was complimented by an "interest-influence" analysis to further explore how the different institutional actors perceived their own interest in, and impact on, jaguar conservation, as well as that of the other institutional actors under scrutiny. From the Q analysis I identified three different narratives which could be described as A; anti-hunting and pro-conservation, B; ecocentric and C; tolerant-towards-jaguars. The three prevailing groups of stakeholders whose opinions constituted these narratives were characterised by institutions linked to government and social movements for the "anti-hunting, pro-conservation" narrative (A), research for the "ecocentric" narrative (B) and cattle farming for the "tolerant-towards-jaguars" narrative (C). Although the jaguar's right to exist in Brazil was fundamental to all three narratives and the over all level of agreement among the narratives was remarkable, there were also significant differences that could be important for successful jaguar conservation. Hunting in general and jaguar hunting in particular were very controversial issues among the narratives. Also the jaguar's ecological role, where jaguars should be allowed to survive and the impacts of hydropower were topics that caused disagreement among the narratives. My findings suggest that jaguar conservation potentially could be symbolic of other social or political divisions in central Brazil. Results from the interest-influence analysis, although mixed, further suggested that the power relationships between

stakeholder institutions were unclear. There was a clear mismatch in perceptions between institutional actors, suggesting that the understandings between actors of their different roles, with respect to jaguars, were poor. These results are worrying, yet not necessarily surprising considering the very broad spectrum of institutions that were involved in the stakeholder analysis. However, the possible implications this holds for jaguars and their conservation could be serious. If the more important stakeholder institutions do not appreciate their roles in jaguar preservation, or do not understand who the other important players are, they may not adequately assume their responsibilities, cooperate with the appropriate partners or take adequate actions with respect to jaguars.

**ABSTRACT IN PORTUGUESE (RESUMO)**

Este estudo buscou investigar e compreender as relações entre diferentes instituições e a onça-pintada (*Panthera onca*), sejam tais relações diretas ou indiretas com o objetivo de esclarecer a configuração atual do conflito de interesses ao nível institucional nos estados de Goiás e Mato Grosso, na região Centro-Oeste do Brasil. Além disso, o estudo procurou entender as relações de poder entre as diferentes instituições. O trabalho foi desenvolvido como parte de um projeto de pesquisa mais amplo sobre conservação da onça-pintada, resultado de uma parceria entre o Instituto Norueguês de Pesquisa para a Natureza (NINA), a Estación Biológica de Doñana (EBD-CSIC), Espanha, e o Instituto Onça-Pintada (IOP), Brasil, em colaboração com a Universidade Norueguesa de Ciências da Vida (UMB).

Para este fim, defini como partes interessadas qualquer instituição que, direta ou indiretamente influenciassem ou fossem influenciadas pelas onças-pintadas, ou ambos. Limitei a amostragem do estudo para os estados de Goiás e Mato Grosso, na região Centro-Oeste do Brasil, envolvendo 32 instituições. Utilizei a metodologia do Q para explorar as narrativas existentes e quais foram os agrupamentos de atores institucionais, baseados nas opiniões dos entrevistados. Complementei a análise do Q por uma análise de "interesse e influência". Esta análise foi utilizada para fornecer um melhor entendimento de como os diferentes atores institucionais percebiam seus próprios interesses e impactos, bem como dos outros atores institucionais do estudo, na conservação da onça-pintada.

A partir dos dados da análise Q identifiquei três narrativas distintas, que podem ser descritas como narrativa A; contra-caça e pró-conservação, narrativa B; ecocêntrica e narrativa C; tolerante as onças-pintadas. A narrativa contra-caça e pró-conservação (A) foi constituída pelas opiniões de entrevistados ligados às instituições governamentais e

movimentos sociais. A narrativa ecocêntrica (B) foi constituída pelas opiniões dos entrevistados ligados às instituições vinculadas a pesquisa, e a narrativa de "tolerância-às-onças-pintadas" (C) foi encontrada nas opiniões de entrevistados ligados às instituições vinculadas a criação de gado. Estas três narrativas explicaram 68 por cento da variação total das respostas, 10 instituições não se acomodaram dentro de nenhuma narrativa.

Nota-se que em todas as três narrativas o direito da onça-pintada de existir no Brasil foi considerado fundamental. Porém, mesmo que o nível de concordância entre as narrativas tenha sido expressivo, também houve diferenças significativas que poderiam ser importantes para o sucesso da conservação da onça-pintada. A caça em geral e caça de onças-pintadas particularmente, foram questões muito controversas. Também o papel ecológico da onça-pintada, a questão de onde se deve possibilitar que as onças-pintadas sobrevivam, e os impactos das hidrelétricas na conservação da onça-pintada, foram temas que provocaram divergências entre as narrativas.

As descobertas deste estudo sugerem que a conservação da onça-pintada poderia ser simbólica de outras divisões sociais e políticas no Centro-Oeste brasileiro. Os resultados da análise de interesse e influência sugeriram que as relações de poder entre as instituições intervenientes não estavam claras. Havia uma incompatibilidade clara nas percepções entre os atores institucionais, sugerindo que os entendimentos entre os atores, sobre seus diferentes papéis em relação às onças-pintadas, eram pobres. Estes resultados são preocupantes, ainda que não necessariamente surpreendentes, considerando o espectro muito amplo de instituições que estiveram envolvidas na análise das partes interessadas. No entanto, as possíveis implicações que isso insinua, para a onça-pintada e sua conservação podem ser graves. Se as instituições intervenientes mais importantes não se conscientizarem de seus papéis na conservação da onça-pintada, ou não entenderem quem são os outros atores importantes, não poderão assumir suas responsabilidades adequadamente, cooperar com os parceiros adequados ou tomar medidas adequadas em relação às onças-pintadas.

*Key Words:* Q methodology; Key institutions; Narrative Analysis; Interest-influence Assessment; Goias; Mato Grosso

ANTHROPOGENIC ACTIVITIES ARE ACKNOWLEDGED AS ONE OF THE MOST PROMINENT DRIVERS OF SPECIES EXTINCTIONS. Yet, the notion of conservation issues as being "people issues" has been adopted only relatively recently by conservation biologists, demonstrated by the significant increase in scientific publications related to conflicts between conservation work and other human interests during the last few decades (Inskip and Zimmermann, 2009). These conflicts, which commonly result in different groups of stakeholders taking polarized and fixed standpoints, may take various forms and their manifestations and scales depend on a multitude of factors (Inskip and Zimmermann, 2009). These conflicts may be material, *e.g.* through damage of property (Singh *et al.*, 2002); economic, typically through depredation on crops or livestock and subsequent loss of income, (Madhusudan, 2003); social and / or emotional, *e.g.* through the skewed distributions of costs and benefits (Heikkinen *et al.*, 2011), or by constituting a direct threat to human survival, (Inskip and Zimmermann, 2009); symbolic, (Moore, 1994); as well as they may be political, as in the case of the controversial Scandinavian wolf (*Canis lupus*) management, ( Kleiven *et al*., 2004, Røskaft *et al*., 2007, Sjölander-Lindqvist, 2006, Skogen *et al*., 2008). Likewise, just as many of these authors also show, conflicts can involve the species itself, the measures used to protect the species, and even the people motivating the conservation. There is, however, great variation in the extent to which conflicts become symbolic and political. Regardless of the form, where large carnivores are the focus of conservation efforts, conflicts are usually conspicuous (see Du Toit *et al.*, 2010). Subsequently, if the underlying people issues involved in conflicts over biodiversity are not adequately addressed and resolved, conservation efforts are not likely to be successful; it is therefore necessary to account for social factors (see Dickman, 2010). An important first step would thus be to explore the interrelated conflicts and to understand the different stakeholders, their views, and their standpoints. In the case of Brazilian jaguar (*Panthera onca*) conservation, conflict exists, but has rarely been explored at a level beyond that of quantification of livestock depredation, with the rare exception of studies such as Cavalcanti *et al.* (2010) and those presented in Cat News Special Issue N° 4 (The Jaguar Conservation Fund, 2008). This study therefore seeks to make a first attempt at filling this knowledge gap. By examining the views of some principal stakeholder institutions, and with the key objective to try to uncover some of the deeper aspects of conflict through a Q analysis, I wanted to determine if jaguars in the Brazilian context could be symbolic of other social or political divisions. To further explore the power relationships between stakeholder institutions, I also employed an "interest-influence" assessment, designed to gain insight into

institutional actors' interest in, and influence on, jaguar conservation, both as perceived by themselves and as perceived by the other institutional actors under scrutiny.

## METHODS

STUDY AREA.—The study area was confined to the states of Goias and Mato Grosso in central Brazil, an area that covers part of the transitional area between the Cerrado savannah and the Amazon rainforest, as well as part of the Pantanal wetlands. All of these biomes are important jaguar habitats (Fig. 1). It is in this part of the country that we find some of Brazil's highest rates of deforestation, where Mato Grosso, as a key state for the "arc of deforestation", alone answers for about half of the clearings of Amazonian forest in Brazil (Fearnside *et al.*, 2009). There are few available data on deforestation in the Cerrado savannah, Brazil's second most important biome both in size and biodiversity (Sano *et al*., 2007), because the government agency responsible for these evaluations does not monitor the Cerrado unless specific projects exist (Fearnside *et al*., 2009). However, we know that much of the Cerrado has already been converted into agricultural lands over the last decades and this is Brazil's most productive grain production area (Sano *et al*., 2007). At the same time, the Cerrado is also Brazil's least protected nature type (Sano *et al*., 2007), with only 5.2% of its area under some sort of protection (Jepson, 2005). Of these, some of the most important conservation areas are found in Goias State, *e.g.* Emas National Park and Chapada dos Veadeiros National Park (Fearnside *et al*., 2009). Additionally the states of Mato Grosso and Goias, together with Mato Grosso do Sul, Tocantins, and parts of São Paulo and Minas Gerais, account for almost 60% of Brazilian cattle farming (Costa and Rehman, 1999). Not surprisingly, for areas such as the Pantanal, cattle ranching forms the dominant economic base (Quigley and Crawshaw, 1992). Goias and Mato Grosso are furthermore the homes of several indigenous tribes that have large areas demarcated for their territories within the two states, especially in the latter (Fundação Nacional do Índio - FUNAI). Although many indigenous groups may "sustainably extract resources" (Hames, 2007), it is hotly debated whether indigenous peoples enhance biodiversity and its conservation, or if their (current) lifestyles deter it (Hames, 2007). Yet, what can be said with certainty is that, with a total population of over nine million inhabitants for the two states (Instituto Brasileiro de Geografia e Estatística) and a yearly increase of 0.88% on a national basis (Indexmundi, 2011), resulting in pressure on land for development projects, the combined impact of indigenous peoples, grain and cattle production, large scale land cover changes, and land use changes is considerable. Subsequent conflicts regarding

jaguars have thus become relatively conspicuous in the area, not least due to cattle depredation and conservation efforts (Michalski *et al*., 2005, Cascelli de Azevedo and Murray, 2007, Hoogesteijn and Hoogesteijn, 2010). Hence the states of Goias and Mato Grosso provide an interesting case study for conflicts related to jaguar conservation.


FIGURE 1. *The historical range of jaguars divided into biogeographic regions and with the approximate outlines of Goias and Mato Grosso States marking the study area, adapted from Zeller ( 2007).*

SPECIES OF INTEREST IN THIS STUDY.—Jaguars are the largest felines in the Americas and on a world basis, only tigers (*Panthera tigris*) and lions (*Panthera leo*) are larger (Burton, 1962). They move across extensive areas and require large habitats (Rabinowitz and Zeller, 2010). Their feeding habits, like their diurnal activity patterns, vary considerably among habitats and have been described as opportunistic (Harmsen *et al*., 2010). Reported prey species include capybara (*Hydrochaerus hydrochaeris*), caimans (*Caiman* spp.), fish, tapir (*Tapirus terrestris*), sloths (*Bradypodidae* spp), armadillos (*Dasypodidae* spp.), and livestock (Harmsen *et al*., 2010, Polisar *et al*., 2003, Semb-Johansson and Macdonald, 1985, Burton, 1962). Consequently jaguars' biology renders them more prone to conflicts with humans, *e.g.*

because of their large size, their extensive home ranges and opportunistic feeding habits (Inskip and Zimmermann, 2009, Woodroffe and Ginsberg, 1998, Cardillo *et al*., 2004). Historically jaguars were found from the current southwestern United States to Argentina (Walker, 1975), (Fig. 1), although the jaguar's present distribution is much smaller (Rabinowitz and Zeller, 2010). On the IUCN Red List of Threatened Species, the jaguar is listed as "Near Threatened" and with a decreasing population trend (IUCN, 2011).

IDENTIFYING STAKEHOLDERS.— As a first step in the stakeholder analysis, different categories of institutional actors either influencing jaguars, influenced by jaguars, or both were identified by consulting current literature on jaguars and the IUCN's listed threats towards jaguars (IUCN, 2011). For each of the categories, about five institutions were chosen for the interviews. The identified priority categories of stakeholders for this study were confined to include "NGOs / scientists", "cattle producers", "agriculture", "environmental institutions / management / government", "tourism", "forestry", "landless / indigenous people", "financial institutions", "hydropower" and "transport". I selected institutions for each of the categories by considering the institutions' representativeness or potential influence within the states of focus and also consulted Mr. Ary Soares dos Santos from the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA) in Goiania, capital of Goias State. For a more detailed description of the institutions and the mechanisms by which the various stakeholders are possibly influencing or influenced by jaguars, refer to Table 1.

Q METHODOLOGY.— I conducted a Q analysis to explore the opinions that institutional stakeholders held about jaguars and jaguar conservation. Q analysis builds on a sorting exercise where subjects are asked to sort a set of statements into a fixed pattern. Typically statements are presented as a set of cards where each card holds a statement. These cards must then be placed on a game board in a predicated pattern, something like in a solitaire card game. However, the "players" decide for themselves where to place which cards, so that their ordering of the statements corresponds to their views on the topic. In this way, analysing the Q sorts allows for the elucidation of consortiums of stakeholder institutions based on their opinions. Q methodology was originally developed by William Stephenson in the 1930's (Brown, 1980), and has since been described as a quantitative method with qualitative traits (Barry and Proops, 1999). It is a kind of discourse (narrative) analysis, but which relies on a robust statistical evaluation (Brown, 1980). By discourse, narrative, or "factor", as these are referred to within Q analysis, we understand "the way a particular individual, in particular

circumstances and at a particular time, relates to, and forms conceptions of, certain aspects of the world" (Barry and Proops, 1999). In this study I use the term narrative.

Q SORTS.—The Q sorts made, or orderings of statements, were conducted face to face with representatives from the different stakeholder institutions and were distributed as a card game in which interviewees were forced to take a position on various issues related to jaguar conservation. For this purpose I had generated a set of 33 statements. These statements may be divided into sets of "values", "threats to jaguars", "impacts of jaguars", and "conservation of jaguars", all referring to a Brazilian setting. Much of the existing literature on jaguars and jaguar-related issues has been directed towards a technical and / or scientific audience, but to include a broader audience, I authored the Q statements. In this manner I somewhat circumvented the risk of having a too technical language, as well as giving me greater freedom in the translation process between English and Portuguese. It further allowed me to include narratives related to jaguars that had so far been poorly documented in the Brazilian setting, but which had been documented in relation to human-carnivore conflicts elsewhere. By borrowing, for example, politicized, metaphoric, social, and emotional narratives from other large carnivore studies, *e.g.* (Heikkinen *et al*., 2011, Jalais, 2008, Kleiven *et al*., 2004, Lemelin, 2009, Marker and Dickman, 2004, Moore, 1994, Sjölander-Lindqvist, 2006), I was able to explore whether these narratives also occurred in Brazil, hence filling in some gaps. Furthermore, the statements generated for this stakeholder analysis were also designed to allow for replicating the study elsewhere, given a slight adaptation to the local setting.

I designed the Q sort according to the guidelines as set up by Brown (1980), with a pyramidal shaped game board or matrix, where each of the 33 statements would fit into a relative scale running from "agree more" to "disagree more". It is important that the scale is relative, in order to make ranking possible, even if a participant agrees or disagrees with all statements (Barry and Proops, 1999). The pyramidal shape or quasinormal distribution used for the matrix helped the participants to "contemplate the Q statements in a thoughtful way" (Webler *et al*., 2009) and facilitated the differentiation between emergent narratives later in the analysis (Brown, 1980, Webler *et al*., 2009). For further details on how to design the pyramidal matrix, refer to Brown (1980). To understand why the interviewees might have held certain opinions, I complimented the Q sorts with a follow-up discussion, in which the interviewees were encouraged to explain why they had arranged the statements in the way they had (Brown, 1980). This follow-up discussion thus aided the portrayal of the different narratives later in the analysis (Webler *et al*., 2009).

Q ANALYSIS.—I evaluated the Q sorts using a narrative (factor) analysis, where the statements were the observations and the sorts provided by the interviewees represented the variation (Webler *et al.*, 2009). In this way we may say that the interviewees had "factorized" themselves, depending on how they had arranged the statement cards within the matrix (Brown, 1980). For the analysis I used the PQMethod software (Schmolck, 2012, available at http://www.lrz.de/~schmolck/qmethod/index.htm). Following the steps described in the software manual, I began by performing a Principle Components Analysis to complete the narrative (factor) analysis. Thereafter I rotated the narratives through a Varimax algorithm to find the best solution. For further analysis, I only considered narratives with eigenvalues greater than 1 (Barry and Proops, 1999) and ran a correlation analysis to uncover the different narratives and clusters of institutional stakeholders. As suggested by Gruber (2011), I followed the recommendations of Barry and Proops (1999) and Webler *et al*. (2009) and found that three narratives worked best to describe the range of narratives within my sample. To present these three narratives and the results from the Q analysis, I followed the method used by Gruber (2011). For additional information on Q methodology, see Barry and Proops (1999), Brown (1980, 1993), and Webler *et al*. (2009).

INTEREST-INFLUENCE ANALYSIS.—To further explore the institutional actors' interest in and influence on jaguar conservation, both as perceived by themselves and by the other institutional actors, I adapted an "interest-influence" assessment to allow for such an analysis. This time the interviewees were asked to place their own institution, as well as the others from this study, within an interest-influence matrix. By doing so, each interviewee created a visual map of how they perceived the institutions in relation to jaguar conservation *per se*, but also in relation to each other with respect to jaguar conservation. I analysed the data by means of a pivot table in Microsoft Excel 2011. Each cell in the interest-influence matrix was assigned a range of coordinates, as well as an absolute coordinate value, and each institution a set of coordinates, which corresponded to each of the placements that it had been given by the 34 interviewees, including the institution's own representative(s). The coordinates, which had been decided by the representative of institution X, were used as a reference for institution X. For institutions for which there was more than one representative, average coordinate values were used. The coordinates allocated to institution X by representatives from the other institutions were used to create a composite coordinate for institution X. This composite coordinate thus gave me an idea of how the interviewees from the other institutions perceived

institution X's interest in, and influence on jaguar conservation. Calculating the average coordinate values for each of the 32 institutions, yielded the composite coordinates. Once all reference and composite coordinates had been found for the 32 institutions, I could determine the institutions' placements within the matrix, both as perceived by the institutions' representatives and by all others. I did this by translating the composite coordinates and the reference coordinates into their corresponding absolute coordinate values within the interest-influence matrix. Thus I was able to compare the two sets of placements within the matrix, and see how like or unlike the self-assessments and the average assessments made by the other institutional actors were, for all the institutions, by calculating the total percentage error among placements. I found the total percentage errors by first estimating the Euclidean Distances for each pair of placements and then divided these by the square root of the largest possible distance between two coordinates, always using the absolute coordinate values. The greater the agreement between assessments, the smaller the total percentage errors; a low error thus implies that, on average, an institution viewed itself in the same or similar way as the other interviewees collectively viewed it. Similarly, greater total percentage errors indicated a greater disagreement between perceptions, which could be due to (1) either the representative of a given institution, e.g. X, did not understand institution X's position, or (2) the other institutional actors poorly understood institutions X's position, that is to say its interest in, and influence on, jaguar conservation. However, to find a measure that may indicate which institutions are relatively more, or less, important to jaguar conservation, I assumed that the assessments made by the institutions' own representatives (reference placements) and by the other institutional actors (composite placements) were both valid for the next enquiry.

Thus I proceeded to summarize the reference, and composite (average) coordinate values for each institution and divided these by two. Thereafter I translated the new composite coordinate values to their corresponding absolute coordinate values within the matrix, so that the positions could be better understood and compared. Next I ordered the institutions hierarchically according to the level of influence that these were conveyed to possess, and within each group, institutions were then ranked in accordance with their presumed interest in jaguar conservation. I ordered institutions primarily based on their presumed influence on jaguar conservation and secondly according to their level of interest because more influential actors are typically relatively more important, whereas interest could be a factor that internally dictates which actors within a group could be relatively more important for jaguar conservation. Hence I obtained some insights into the power relations

among the different institutions, with regard to jaguar conservation, and obtained an idea of which institutions might be comparatively more important for successful jaguar conservation.

To further test how well the institutions' reference placements corresponded to those of the other institutional actors, using the placements of all interviewees, I had to look at interest and influence separately. I calculated the Chi-square p values for every institution excluding the institution's own representative's assessment, and compared all other assessments of an institution's interest, or influence, with an expected scenario that corresponded to a situation in which all other interviewees would have assessed an institution X in the same way as the institution's own representative. In this way I was able to identify which institutions viewed themselves significantly different from how the other institutions viewed them.

## RESULTS

STAKEHOLDER INSTITUTIONS.—Between 11 November 2011 and 18 January 2012, 34 participants from 32 stakeholder institutions completed the Q sort and interest-influence exercises. The interviewees were typically persons from rather high up in the administration or from senior positions within the target institutions. Table 1 describes the institutions that participated in the stakeholder analysis and some of the mechanisms by which they might influence, or be influenced by, jaguars and their conservation. Table 1 does not provide an absolute or exhaustive list of the relations that exist between jaguars and these institutions but merely constitutes some, or the most important, examples.

TABLE 1. *The categorized priority stakeholder institutions that participated in this study, the nature and level of their activities, and some of the mechanisms by which they might influence or be influenced by jaguars.*

| **NGOs / Scientists** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **CENAP**, National Centre for Research and Conservation of Carnivorous Mammals.<br><br>(Centro Nacional de Pesquisa e Conservação de Mamíferos Carnívoros) | CENAP is a national centre within ICMBio and works with research and conservation of carnivorous mammals. | Research aimed to contribute to policy, management and conservation. | The demand for research on, and management of jaguars warrants the need for CENAP and creates jobs for its associates. |
| **ICMBio**, The Chico Mendes Institute for Biodiversity Conservation.<br><br>(Instituto Chico Mendes de Conservação da Biodiversidade) | National institution linked to the ministry of environment, MMA. ICMBio is responsible for managing the Brazilian conservation areas. | Research aimed to contribute to policy, management and conservation practises. Implementation of policies and conservation work. | The demand for management of, and research on jaguars warrants the need for ICMBio and creates jobs for its associates. |
| **ISPN**, The Institute for the Society, Population and Nature.<br><br>(Instituto Sociedade, População e Natureza) | National NGO working with social issues | Research. Promote social and ecological sustainability and resilience, with focus on the human populations. Could foster practises that minimize the negative interactions | Jaguars could affect the quality of life for the people that live in jaguar areas, through perceived and /or real treats to their livelihoods. This could direct ISPN's work with these people |

| | | | |
|---|---|---|---|
| | | between locals and jaguars. | to enhance their living conditions. |
| **WWF**, The World Wildlife Fund. | International environmental NGO working on national basis | WWF is involved in projects, research and information sharing aimed to contribute to policy, more environmentally friendly management practises, and efficient conservation work. | The demand for management of, and research on jaguars and biodiversity in general warrants the need for WWF and creates jobs for its associates. |

| **Cattle producers*** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **AGRODEFESA**, Agricultural Protection Agency of Goias.<br><br>(Agência Goiana de Defesa Agropecuária) | State agency working with the conduct of agricultural policy for the state of Goias. AGRODEFESA is allied with SEAGRO and EMATER | Decision-making about management within the agricultural sector. Could contribute to the use of more or less jaguar friendly practices. | Conflicts with jaguars may highlight areas in need of special attention from AGRODEFESA. |
| **CNA**, Brazilian Confederation of Agriculture and Livestock.<br><br>(Confederação da Agricultura e Pecuária do Brasil) | CNA is the national forum for discussions and decisions for Brazilian farmers, and represents the rights of agricultural producers and their economic interests. | Influence farmers' choice of management practises and methods, for example through information sharing. | Conflicts with jaguars may direct part of CNA's attention and influence where it puts its resources. |
| **EMATER**, Company of Technical Assistance and Rural Extension for the State of Goias.<br><br>(Empresa de Assistência Técnica e Extensão Rural do Estado de Goiás) | State company for the state of Goias, working with research to improve agricultural production systems and management, with special emphasis on economic and social aspects. | Could contribute to the accelerated competition over lands and new management practices | Jaguars could highlight areas where technical assistance is needed. |
| **FETAEG**, Goias' Farmers'Association.<br><br>(Federação dos Trabalhadores da Agricultura do Estado de Goiás) | A farmers' association, for the state of Goias. | Inform and influence the farmers' choice of management practises and methods. Also, retaliatory killing by cattle farmers. | Work to avoid jaguar depredation. Jaguars could compromise the wellbeing of farmers that live in jaguar areas. |
| **SEAGRO**, Secretariat of Agriculture, Livestock and Irrigation for the State of Goias.<br><br>(Secretaria de Agricultura, Pecuária e Irrigação do Estado de Goiás) | Secretariat at state level for the state of Goias, responsible for the conduct of agricultural policy of the state of Goias, together with EMATER and AGRODEFESA | Decision-making related to management practices within the agricultural sector. | Jaguars could highlight areas where management assistance is needed. |

| **Agriculture*** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **Embrapa**, Brazilian Institute for Research on Agriculture and Livestock keeping.<br><br>(Empresa Brasileira de Pesquisa Agropecuária) | National research institute with departments organized around different research areas in different states. | Research aimed to contribute to policy and management practises within the agricultural sector. | Depredation on cattle by jaguars might influence Embrapa to invest in research aimed to prevent such interactions. |
| **INCRA**, National Institute of Agrarian Reform and Colonization.<br><br>(Instituto Nacional de Colonização e Reforma Agrária) | National institute under the Ministry of Agrarian Development, MDA, that works with the redistribution of lands. | Fragmentation of larger farms into smaller ones could lead to the fragmentation of larger Privately Protected Areas**, and disconnect jaguar habitats. Small-scale farming could be more beneficial for jaguars, *e.g.* agro-ecology *vs.* large-scale monocultures. | Protected areas could influence where new settlements are possible and what sort of activities might be practical and / or viable. |
| **MAPA**, Ministry of Agriculture, Livestock and Supply.<br><br>(Ministério de Agricultura, pecúaria e abastecimento) | National ministry responsible for the management of public policies aimed to stimulate agriculture, agribusiness and the promotion of the regulation and standardization of related services. | Decision-making about policies, agriculture and livestock. | Jaguars could influence MAPA to seek policies that both protect farmers' interests and minimize risks to jaguars through negative interactions. |
| **MDA**, Ministry of Agrarian Development.<br><br>(Ministerio Desenvolvimento Agrário) | National ministry responsible for the land reform and agrarian reorganization, land tenure in the Amazon region and promotion of sustainable family farming and rural | Promotion of agricultural development possibly promots conflicts over land uses. Stimulating sustainable family farming could contribute to agro-ecological landscapes as | The presents of jaguars in certain areas could possibly affect where and how MDA approaches its goal of promoting sustainable family farming. |

| | | | |
|---|---|---|---|
| | communities. | opposed to monocultures. | |

| **Environmental institutions / management / government** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **IBAMA**, Brazilian Institute for Environment and Renewable Natural Resources.<br><br>(Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis) | National institute linked to the Ministry of Environment, MMA. IBAMA is the executive body responsible for implementing the National Environmental Policy (PNMA). | IBAMA implements and monitors policy, management and protected areas that directly affect jaguars, on a national level. | The demand for management of Brazil's natural environment, flora and fauna warrants the need for IBAMA and creates jobs for its associates. |
| **MMA**, Ministry of Environment.<br><br>(Ministério do Meio Ambiente) | National ministry responsibile for the National Environmental Policy (PNMA), the Environmental Programs for the Legal Amazon, water resources policy, policies of preservation, conservation and sustainable use of ecosystems, biodiversity and forests, policies for the integration of environment and production strategies, for the improvement of environmental quality and sustainable use of natural resources, and ecological-economic zoning. | MMA sets the environmental policies that affect jaguars, on a national level. | The presence of jaguars obligates MMA to create policies that do not compromise their existence in Brazil, or at least minimizes the risks posed to jaguars. |
| **SEMARH**, Department of Environment and Water Resources.<br><br>(Secretaria do Meio Ambiente e dos Recursos Hídricos) | Environmental state department for Goias responsible for the state's water resources, forests and biodiversity. SEMARH coordinates and participates in the development of agro-ecological-economic zoning and is responsible for the System of Prevention and Control of Environmental Pollution as well as the coordination and management of the State System of Conservation Units. | SEMARH formulates, coordinates, articulates and implements the state policy, management and protection of environmental resources. | As the responsible unit for the biodiversity of Goias State, SEMARH is obliged to look after the interests of jaguars in Goias. |

| **Tourism** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **AGETUR**, Goias State Agency of Tourism.<br><br>(Agência Goiana de Turismo do Estado de Goiás) | State agency for the state of Goias that works with tourism. | Could contribute to more positive attitudes towards jaguars by informing the public and foster respect and fascination for the animal. Could put pressure on jaguars or habituate them to people leading to more encounters between rural people and jaguars. | Symbol and marketing tool to promote tourism in national parks and different areas. Jaguar safaris, *e.g.*, if poorly organized could make jaguars anxious, and provoke attacks on people. |
| **MTUR**, Ministry of Tourism.<br><br>(Ministerio do Turismo) | National ministry working with tourism and its associated policies, on a national level. | Same as for AGETUR but on a national level for Brazil. | Protected areas may dictate where tourism is possible or not. Also see AGETUR. |

| **Forestry** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **IMAFLORA**, Institute for Agricultural and Forest Management and Certification<br><br>(Instituto de manejo e Certificação Florestal e Agrícola) | National NGO that works to encourage both conservation and sustainable use of natural resources and promote social benefits in the forest and agricultural sectors. | Less intrusive forestry management. Greater appreciation for native vegetation, biodiversity and protected areas as the forest certification becomes a trademark of quality that renders economic revenue. | Jaguars as an indicator for the quality of forest habitats and a parameter for assessing logging practises in the certification process. |

| | | | |
|---|---|---|---|
| **SFB**, Brazilian Forest Service,<br><br>(Servico Florestal Brasileiro) | National institute within the Ministry of Environment, MMA. Monitors and measures possible impacts on biodiversity and different ecological groups as a result of logging activities in three concession areas in a National Forest in Rondonia. | Less intrusive forestry management. | Jaguars as an indicator for the quality of the forest habitats and indicator of implications of logging practises. |

| **Landless / Indigenous people** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **CIMI – CNBB**, Indigenous Missionary Council - National Conference of Brazilian Bishops<br><br>(Conselho Indigenista Missionário - Conferência Nacional dos Bispos do Brasil) | Missionary council working on a National level to support the struggle of indigenous peoples and communities for recovery, demarcation and ensuring the integrity of their territories. | The indigenous groups that CIMI-CNBB works with could influence jaguars, for example through hunting, cultural practices and land tenure. | Indigenous groups might be affected in similar ways as people from MST or Vía Campesina. Also, jaguars have had strong influence on many indigenous cultures and have been granted religious, symbolic and magical attributes. |
| **MST**, The Landless Workers' Movement<br><br>(Movimento dos Trabalhadores Rurais Sem Terra) | Possibly one of the greatest social movements in Latin America. MST struggles for access to land for poor and landless rural people in Brazil. | Fragmentation of larger farms into smaller ones could lead to the fragmentation of larger Privately Protected Areas, and disconnect jaguar habitats. Small-scale farming could be more beneficial for jaguars, *e.g.* agro-ecology *vs.* large-scale monocultures. Yet MST mostly represents poor and marginalized people that often lack the means necessary to implement sustainable agro-ecology. | People who have received their lands through the MST, could be influenced through livestock depredation, different management implications, and their perceptions of security and quality of life. |
| **Vía Campesina**, International Peasants' Movement<br><br>(La Coordinadora Latinoamericana<br>de Organizaciones del Campo) | International farmer's movement that defends small-scale sustainable agriculture as a way to promote social justice and dignity. | Small-scale farming could be more beneficial for jaguars, *e.g.* agro-ecology *vs.* large-scale monocultures. | Jaguars could influence farmers through livestock depredation, management implications, and peoples' perceptions of security and quality of life. |

| **Hydropower** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **ANA**, National Water Agency.<br><br>(Agência Nacional de Águas) | National agency working on a national level to monitor the water quality of Brazil's superficial water resources and promote the sustainable use of water resources. | ANA works to secure a healthy water environment that may sustain both humans and *e.g.* jaguars. | Protected areas could decide where certain activities are possible and not, possibly affecting or hindering the use of some water resources. |
| **ANEEL**, Brazilian Electricity Regulatory Agency.<br><br>(Agência Nacional de Energia Elétrica) | National Agency working to induce the development of Brazil and attend the market needs in terms of infrastructure to distribute electricity on a national level. | Large-scale projects could affect jaguars and their habitats aversively. | Protected areas and the preservation of jaguars could possibly deter or compromise certain activities led by ANEEL. |
| **CELG**, Power plants in Goias<br><br>(Centrais elétricas do Goiás) | State electricity company for Goias working to assist the development of the state, and attend the market needs in terms of infrastructure to distribute electricity. | Infrastructure projects could affect the environment negatively or lead to loss or fragmentation of jaguar habitat | Protected areas and the preservation of jaguars could possibly deter or compromise certain activities led by CELG. |
| **MME**, Ministry of Mines and Energy<br><br>(Ministerio Minas e Energia) | National Ministry working on a national level with issues related to mining and energy. | Mining could cause drastic changes in an environment. | Protected areas could deter or compromise certain activities under the MME. |

| **Financial Institutions** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **FNMA**, National Environmental Fund. | FNMA is a financing agent within the Ministry of | Socio-environmental projects could contribute to the | Where jaguars present good or strategic investment |

| | | | |
|---|---|---|---|
| (Fundo Nacional do Meio Ambiente) | Environment, MMA. Its mission is to contribute to the implementation of the National Environment Policy (PNMA), through finance and social participation. | conservation of jaguars, sustainable use of natural resources and possibly also a better understanding and tolerance for jaguars among the Brazilian population. | opportunities FNMA may want to contribute to project implementation. |
| **FUNBIO**, Brazilian Fund for Biodiversity.<br><br>(Fundo Brasileiro para a Biodiversidade) | A national fund working for the conservation of biodiversity, good planning and management of natural resources and their use. | The projects "Sustainable Cerrado", "Policies and Monitoring the Cerrado Biome", and "Program for Protected Areas in the Amazon", contribute to the protection of jaguar habitats. Other projects focus specifically on jaguars. | Where jaguars present good or strategic investment opportunities FUNBIO may want to place some of its assets to contribute to project implementation. |
| **PRONAF**, National Program to Strengthen Small Scale Agriculture.<br><br>(Programa Nacional de Fortalecimento da Agricultura Familiar) | National program under the Ministry of Agrarian Development, MDA with the aim to promote small-scale farming through finance and loans. | Small-scale agriculture could deter or enhance connectivity between jaguar habitats by only providing small and possibly disconnected Privately Protected Areas or a matrix of semi natural vegetation through which jaguars might move more readily, depending on the farmers' competence and resources. | PRONAF might want to invest in projects or management measures to do with jaguars where this could contribute to better conditions for small-scale farming. |
| **The World Bank** | An international bank with national chapters | Projects such as the "Sustainable Cerrado Initiative: Goias Sustainable Cerrado & ICMBio Cerrado Biodiversity Protection Project" contributes to the conservation of jaguar habitat. Other projects could hamper jaguar conservation. | Where jaguars present good or strategic investment opportunities the World Bank may want to place some of its assets to contribute to project implementation. |

| **Transport** | | | |
|---|---|---|---|
| **Institution** | **Nature and Level of Activity** | **Possible influence on Jaguars** | **Possible influence by Jaguars** |
| **DNIT**, National Bureau of Infrastructure and Transport<br><br>(Departamento Nacional de Infraestrutura e Transporte) | Executive entity for (terrestrial) public transport and infrastructure on a national level, linked to the Ministry of Transport. | Development of infrastructure and transport could affect conservation work aversively. | Protected areas could deter or compromise certain projects lead by DNIT. |

** For the agricultural sector and the cattle production there is a great overlap as the responsibilities over these two activities often fall under the same institutions.*

*** All Brazilian landowners are by law obliged to set aside part of their land as a Privately Protected Area in which native vegetation and fauna must be kept.*

NARRATIVES.—Three narratives prevailed in the Q sorts, (Tables 2, 3, and 4). Table 2 shows that 24 of the 34 sorts (orderings of statements made by the interviewees) loaded significantly onto one of the three narratives; narrative A, narrative B and narrative C. Together these three narratives explained 68 per cent of the total variance; 10 of the sorts did not significantly load on any narrative. Loading on a narrative requires a probability of $p < 0.05$ (Gruber, 2011). The loadings for each of the narratives, A, B and C, are also listed in Table 2. Positive scores indicate agreement with a narrative and negative scores indicate disagreement. Scores run from a complete agreement with a narrative loading of 1 to a complete disagreement with a narrative loading of -1. Table 3 illustrates the narrative rankings, from -4, disagree most, to 4, agree most, for each of the 33 Q statements, for the optimal Q sorts for the three narratives, A, B and C. Optimal Q sorts describe the orderings of Q statements, as they would appear for persons who completely agreed with the narratives, *i.e.* had narrative loadings of 1. The

optimal Q sorts are also illustrated in Fig. 2, in which the pyramidal shape of the matrix can be seen clearly. The Q statements for which there is a general consensus among all three narratives are shown in the right hand column of Table 3. These are defined as full consensus statements with a spread of one narrative ranking, or general concurrence statements with a spread of one to two narrative rankings. Table 4 shows the narrative correlation with Varimax rotation, where a value of 1.00 indicates a complete correlation, and illustrates that the differences between the three narratives are subtle. The values of composite reliability and standard errors of narrative scales also indicated a high probability of obtaining the same results again if the Q sorts were to be repeated with the same subjects under the same conditions and a high reliability in narratives.

Below follows a description of each of the three narratives with numbers in parenthesis that refer to specific Q statements that were important to each of the narratives (Table 3; Fig. 2). The narratives are also accompanied by a description of the interviewees who cluster around a specific narrative, and the institutions to which they pertain (Table 2).

**Narrative A** (Per cent Explanation of Variance: 29%, Number of Sorts: 13)

| disagree most | | | | | | | | agree most |
|---|---|---|---|---|---|---|---|---|
| -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| 10 | 26 | 14 | 17 | 5 | 28 | 25 | 31 | 23 |
| 24 | 22 | 19 | 32 | 21 | 6 | 7 | 27 | 1 |
| | 33 | 4 | 16 | 20 | 13 | 8 | 11 | |
| | | 15 | 29 | 18 | 3 | 12 | | |
| | | | 9 | 2 | 30 | | | |

**Narrative B** (Per cent Explanation of Variance: 24%, Number of Sorts: 7)

| disagree most | | | | | | | | agree most |
|---|---|---|---|---|---|---|---|---|
| -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| 10 | 15 | 19 | 28 | 17 | 6 | 31 | 7 | 12 |
| 4 | 14 | 22 | 2 | 29 | 20 | 21 | 1 | 25 |
| | 26 | 24 | 5 | 23 | 27 | 32 | 8 | |
| | | 16 | 11 | 13 | 18 | 30 | | |
| | | | 9 | 33 | 3 | | | |

**Narrative C** (Per cent Explanation of Variance: 15%, Number of Sorts: 3)

| disagree most | | | | | | | | agree most |
|---|---|---|---|---|---|---|---|---|
| -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| 4 | 10 | 26 | 22 | 7 | 5 | 32 | 12 | 11 |
| 29 | 33 | 15 | 23 | 16 | 24 | 31 | 21 | 27 |
| | 20 | 14 | 18 | 28 | 6 | 2 | 1 | |
| | | 8 | 25 | 30 | 17 | 13 | | |
| | | | 19 | 9 | 3 | | | |

FIGURE 2. *Optimal Q sorts for narratives A, B and C, where each number refers to a specific Q statement (Table 3), and the narrative rankings range from -4, "disagree most", to 4, "agree most". Optimal Q sorts describe the orderings of Q statements, as they would look for persons who completely agreed with the narratives, i.e. had narrative loadings of 1. The number of sorts refers to the number of persons whose opinions make up a specific narrative about jaguar conservation in central Brazil (A, B or C). The "Per cent Explanation of Variance" describes how much of the total variation, among all 34 sorts, each narrative explains.*

NARRATIVE A.—This was an anti-hunting, pro-conservation narrative with a strong focus on the jaguars' intrinsic right to exist. It comprised the attitudes of 14 individuals, mainly from national institutions that worked on a national level. They worked in the areas of cattle farming, agriculture, environmental management and governance, tourism, forestry, landless and indigenous people's rights, hydropower, and finance. Individuals who clustered into this narrative held a much more negative view of retaliatory killing of jaguars

TABLE 2. *Reordered narrative matrix for the narratives about jaguars and their conservation in Goias and Mato Grosso, in central Brazil. Significant narrative loadings are shown for all institutions. Loading on a narrative requires a probability of $p < 0.05$. Positive scores indicate agreement with a narrative and negative scores indicate disagreement. Scores run from a complete agreement with a narrative loading of 1 to a complete disagreement with a narrative loading of -1.The institutional categories, from which interviewees came, are indicated for each narrative. Also the level of activity is specified for every institution, and is confined to "State"; "GO" for the state of Goias, "National" and "International". Unless otherwise specified the interviewee came from an office at the same level, "State office" or "Nat. office" (national office). For more details about the institutions, see Table 1.*

| Institutional category | Participant's Institution | Level of activity | Narrative A | Narrative B | Narrative C |
|---|---|---|---|---|---|
| **Narrative A; anti-hunting, pro-conservation** | | | | | |
| Cattle producers | FETAEG | State, GO | 0.7005* | 0.2709 | 0.1826 |
| Agriculture | MAPA | National, GO State office | 0.6999* | 0.3300 | 0.3333 |
| Environmental institutions / management / government | IBAMA | National | 0.6422* | 0.3904 | 0.4447 |
| | SEMARH | State, GO | 0.6823* | 0.3219 | 0.4604 |
| | MMA | National | 0.7365* | 0.5321 | 0.1386 |
| Tourism | MTUR | National | 0.7692* | 0.2161 | 0.3338 |
| | AGETUR | State, GO | 0.7028* | 0.5012 | 0.2332 |
| Forestry | SFB | National | 0.6620* | 0.5104 | 0.3730 |
| Landless / Indigenous people | Via Camp. | National | 0.7627* | 0.2712 | 0.1574 |
| | CIMI-CNBB | National | 0.6221* | 0.3811 | 0.2247 |
| | MST | National, GO State office | 0.7000* | -0.2777 | -0.0882 |
| Hydropower | ANA | National | 0.6505* | 0.3326 | 0.3028 |
| | MME | National | 0.6187* | 0.2214 | 0.1958 |
| Financial institutions | FNMA | National | 0.6929* | 0.4608 | 0.1882 |
| **Narrative B; ecocentric** | | | | | |
| NGOs & Scientists | ICMBio | National | 0.3613 | 0.7840* | 0.0883 |
| | ISPN | National | 0.1184 | 0.6881* | 0.2654 |
| | CENAP | National | 0.4598 | 0.7219* | 0.3308 |
| Agriculture | Embrapa | National | 0.1861 | 0.7836* | -0.1110 |
| Landless / Indigenous people | MST | National | 0.4917 | 0.6130* | 0.2235 |
| Financial institutions | World Bank | International, Nat. office | 0.4239 | 0.6567* | 0.1682 |
| | FUNBIO | National | 0.1983 | 0.6642* | 0.3444 |
| **Narrative C; tolerant-towards-jaguars** | | | | | |
| Cattle producers | EMATER | State, GO | 0.1940 | -0.1570 | 0.7732* |
| | SEAGRO | State, GO | 0.1524 | 0.4597 | 0.6826* |
| Hydropower | CELG | State, GO | 0.1844 | 0.1231 | 0.8308* |
| **Non-significant loading** | | | | | |
| NGOs & Scientists | WWF | International, Nat. office | 0.6286 | 0.5641 | 0.3457 |
| Cattle producers | AGRODEFESA | State, GO | 0.4236 | 0.3844 | 0.5293 |
| | CNA | National | 0.0847 | 0.4789 | 0.4793 |
| Agriculture | MDA | National, GO State office | 0.6107 | 0.5208 | 0.3582 |
| | INCRA | National, GO State office | 0.4162 | 0.3769 | 0.5539 |
| Forestry | IMAFLORA | National | 0.5441 | 0.5347 | 0.2083 |
| Hydropower | ANEEL | National | 0.3836 | 0.4454 | 0.5112 |
| Financial institutions | PRONAF | National | 0.4891 | 0.3302 | 0.4224 |
| | FUNBIO | National | 0.5526 | 0.6044 | 0.2845 |
| Transport | DNIT | National | 0.4850 | 0.5644 | 0.4220 |

** indicates a significant sort*

TABLE 3. *Factor ranking of Q-sort statements and consensus/concurrence statements for the optimal Q sorts for the three narratives, A; anti-hunting, pro-conservation, B; ecocentric and C; tolerant-towards-jaguars. Optimal Q sorts describe the orderings of Q statements, as they would look for persons who completely agreed with the narratives, i.e. had narrative loadings of 1. Numbers refer to the statements and narrative rankings describe the statements' positions within the optimal Q sorts, and run from "disagree most" (-4) to "agree most" (4) (Fig. 2). More important statements are those for which the narrative rankings are the highest or the lowest and which accordingly are perceived of as relatively more significant for jaguars and their conservation in Goias and Mato Grosso, central Brazil. The closer to the middle the statements were placed (Fig. 2), the closer to 0 their narrative rankings were, and the less important for jaguar conservation in Goias and Mato Grosso they were, in accordance with narratives A; anti-hunting, pro-conservation, B; ecocentric and C; tolerant-towards-jaguars, respectively. The consensus and general concurrence statements indicated in the right hand column, depict the topics for which there was a high level of agreement among the three narratives A, B and C, and describe beliefs that were shared among the persons whose opinions make up these narratives.*

| Nr. | Q-Statements | Narrative rankings | | | Consensus or General Concurrence |
|---|---|---|---|---|---|
| | | A | B | C | |
| 1 | Jaguars have the right to exist in Brazil | 4 | 3 | 3 | *** |
| 2 | Mining is a threat to jaguar survival | 0 | -1 | 2 | |
| 3 | The construction and upgrading of new roads is a major threat to jaguar survival | 1 | 1 | 1 | *** |
| 4 | Jaguar conservation represents a threat to human rights and basic freedoms | -2 | -4 | -4 | ** |
| 5 | The hunting of jaguars for their skins is a major threat to their survival | 0 | -1 | 1 | ** |
| 6 | The survival of healthy jaguar populations is a positive symbol for Brazil's as a modern nation in the 21st century | 1 | 1 | 1 | *** |
| 7 | It is important that future generations of Brazilians should be able to experience jaguars in the wild | 2 | 3 | 0 | |
| 8 | The presence of jaguars is crucial for the health of forest ecosystems | 2 | 3 | -2 | |
| 9 | The present focus on jaguar conservation involves an unwelcome degree of involvement from foreign organizations | -1 | -1 | 0 | *** |
| 10 | Jaguars represent a major threat to the economic viability of cattle ranching | -4 | -4 | -3 | *** |
| 11 | Illegal killing of their prey is a major threat to jaguar survival | 3 | -1 | 4 | |
| 12 | Logging of forests represents a major threat to the survival of jaguars | 2 | 4 | 3 | ** |
| 13 | Jaguars can only survive in wilderness areas | 1 | 0 | 2 | ** |
| 14 | Jaguar conservation benefits the rich while the poor pay the price | -2 | -3 | -2 | *** |
| 15 | Jaguar conservation represents a serious obstacle to rural development | -2 | -3 | -2 | *** |
| 16 | Hunting by indigenous people represents a threat to jaguar survival | -1 | -2 | 0 | ** |
| 17 | The conversion of cattle ranches to crop production threatens the survival of jaguars | -1 | 0 | 1 | ** |
| 18 | Jaguars represent a high value for promoting ecotourism in Brazil | 0 | 1 | -1 | ** |
| 19 | Carefully regulated trophy hunting of jaguars may be a useful tool to promote their conservation | -2 | -2 | -1 | *** |
| 20 | Jaguars should be allowed to survive throughout Brazil, including in human-modified landscapes | 0 | 1 | -3 | |
| 21 | The conservation of jaguars should be primarily based on scientific knowledge | 0 | 2 | 3 | |
| 22 | Jaguars are a threat to human safety | -3 | -2 | -1 | ** |
| 23 | The killing of jaguars should always be prohibited | 4 | 0 | -1 | |
| 24 | Ranchers should be allowed to kill jaguars that kill cattle | -4 | -2 | 1 | |
| 25 | Conserving jaguars will also conserve many other species | 2 | 4 | -1 | |
| 26 | Jaguar conservation represents an obstacle to the economic development of Brazil | -3 | -3 | -2 | *** |
| 27 | It is important to establish protected areas for jaguars | 3 | 1 | 4 | |
| 28 | Brazil has a major international obligation to ensure that jaguars survive | 1 | -1 | 0 | ** |
| 29 | Decisions about jaguar conservation should be taken at the local level | -1 | 0 | -4 | |
| 30 | Retaliatory killing of jaguars by ranchers is a major threat to their survival | 1 | 2 | 0 | ** |
| 31 | It is necessary for public environmental agencies to take measures that will secure the connectivity of jaguar populations. | 3 | 2 | 2 | *** |
| 32 | The development of hydroelectric power plants causes conflict with the preservation of jaguar habitat. | -1 | 2 | 2 | |
| 33 | To hunt for jaguars is an act of bravery and skill that increases the hunter's reputation in the community | -3 | 0 | -3 | |

*Note: Full consensus statements (***) are those statements shared by all three narratives and are within a spread of one factor ranking. General consensus statements (**) are those statements shared by all three narratives and are between one to two factor rankings.*

than representatives from the other two narratives, and opposed ranchers being allowed to kill jaguars that kill cattle (24). On the contrary, and contrary also to the other two narratives, most of them were of the opinion that jaguar killing should always be prohibited (23). They did not believe that jaguars were a threat to human safety (22) nor that jaguars represented a major threat to the economic viability of cattle ranching (10), a belief shared among all three narratives. These individuals opposed views of jaguar hunting as an act of bravery and skill (33) and thought that the illegal killing of their prey was a major threat to jaguar survival (11). For them it was an important point that jaguars have the right to exist in Brazil (1), also a belief shared among all three narratives, but more highly valued within narrative A. They further believed that it would be necessary for public environmental agencies to take measures that would secure the connectivity of jaguar populations (31) and to establish protected areas for jaguars (27) to secure their survival. In addition, it was much less important for individuals from narrative A that the conservation of jaguars should be based primarily on scientific knowledge (21) than for individuals from narratives B and C. It was also the only narrative to view the development of hydroelectric dams (32) as relatively unproblematic for jaguar conservation, and considered the effects of mining (2) in a neutral light.

NARRATIVE B.—This ecocentric narrative primarily focused on the jaguar as an integral part of the ecosystems in which it lives and had special emphasis on how jaguar conservation would enhance the conservation of other species (25). An important theme was that jaguar conservation would not compromise Brazil's social or economic development. For example, jaguar conservation was not viewed as a threat to human rights or basic freedoms (4), as a constraint to the economic viability of cattle ranching (10), the economic development of Brazil (26), nor to its rural development (15). Jaguar conservation was also not thought to bring about any skewed distributions of costs and benefits between rich and poor (14), but

TABLE 4. *Narrative correlation with Varimax rotation describing the correlation between the three narratives about jaguars and jaguar conservation in Goias and Mato Grosso, in central Brazil; narratives A; anti-hunting, pro-conservation, B; ecocentric and C; tolerant-towards-jaguars. A complete correlation between narratives corresponds to a value of 1.00. The composite reliability describes the probability of obtaining the same results for the Q sorts if these were to be repeated with the same subjects under the same conditions. A usually accepted threshold value for composite reliability is 0.70 (Sridharan et al., 2010). Similarly, the standard errors of narrative scales is a measure of reliability where lower values indicate higher reliability in narratives (Brown, 1980).*

| Narrative | A | B | C |
|---|---|---|---|
| A | 1.00 | | |
| B | 0.74 | 1.00 | |
| C | 0.52 | 0.40 | 1.00 |
| Composite reliability | 0.982 | 0.966 | 0.923 |
| Standard error of narrative scales | 0.132 | 0.186 | 0.277 |

was viewed in a positive light and considered important for the future generations of Brazilians so that they should be able to experience jaguars in the wild (7). Although logging of forests was considered a major threat to jaguars (12), which were thought of as essential for the health of forest ecosystems (8), the establishment of protected areas for jaguars (27) was seen as less important than for the other two narratives. Contrary to narratives A and C, both illegal hunting of jaguar prey species (11) and killing jaguars for their skins (5) were not regarded as major threats to jaguar survival. Mining (2), as well as hunting by indigenous peoples (16), were also considered less threatening. Additionally, narrative B was the only narrative that was relatively neutral towards local decision-making about jaguar conservation (29), the hunting of jaguars (23), and views of jaguar hunting as an act of bravery and skill (33). The seven individuals who were associated with this narrative all came from national or international institutions that work on the national level. A majority of the institutions engaged with research, either directly or indirectly. NGOs and scientists working with environmental issues, social issues and agriculture, as well as a couple of financial institutions and MST, were found in this narrative.

TABLE 5. *The consensus and general concurrence statements depict the topics for which there was a high level of agreement among the three narratives A; anti-hunting, pro-conservation, B; ecocentric and C; tolerant-towards-jaguars, and describe beliefs that were shared among the persons whose opinions make up these narratives. The numbers in the left hand column refer to the statements and the narrative rankings in the right hand column refer to the statements' positions within the pyramidal matrix for the optimal Q sorts (Fig.2). More important statements are those for which the narrative rankings are the highest or the lowest and which accordingly are perceived of as relatively more significant for jaguars and their conservation in Goias and Mato Grosso, in central Brazil. The closer to the middle the statements were placed (Fig. 2) the closer to 0 their narrative rankings became, and the less important for jaguar conservation in Goias and Mato Grosso they became, in accordance with narratives A; anti-hunting, pro-conservation, B; ecocentric and C; tolerant-towards-jaguars.*

| Nr. | Q statement | Narrative ranking |
|---|---|---|
| | **More important statements** | |
| 1 | Jaguars have the right to exist in Brazil*** | 3 to 4 |
| 10 | Jaguars represent a major threat to the economic viability of cattle ranching*** | -4 to -3 |
| 4 | Jaguar conservation represents a threat to human rights and basic freedoms** | -4 to -2 |
| 12 | Logging of forests represents a major threat to the survival of jaguars** | 4 to 2 |
| 26 | Jaguar conservation represents an obstacle to the economic development of Brazil*** | -3 to -2 |
| 15 | Jaguar conservation represents a serious obstacle to rural development*** | -3 to -2 |
| 14 | Jaguar conservation benefits the rich while the poor pay the price*** | -3 to -2 |
| 31 | It is necessary for public environmental agencies to take measures that will secure the connectivity of jaguar populations.*** | 2 to 3 |
| | **Somewhat important statements** | |
| 22 | Jaguars are a threat to human safety** | -3 to -1 |
| 19 | Carefully regulated trophy hunting of jaguars may be a useful tool to promote their conservation*** | -2 to -1 |
| 16 | Hunting by indigenous people represents a threat to jaguar survival** | -2 to 0 |
| 13 | Jaguars can only survive in wilderness areas** | 0 to 2 |
| 30 | Retaliatory killing of jaguars by ranchers is a major threat to their survival** | 0 to 2 |
| | **Less important statements** | |
| 3 | The construction and upgrading of new roads is a major threat to jaguar survival*** | 1 |
| 6 | The survival of healthy jaguar populations is a positive symbol for Brazil's as a modern nation in the 21st century*** | 1 |
| 9 | The present focus on jaguar conservation involves an unwelcome degree of involvement from foreign organizations*** | -1 to 0 |
| 5 | The hunting of jaguars for their skins is a major threat to their survival** | -1 to 1 |
| 17 | The conversion of cattle ranches to crop production threatens the survival of jaguars** | -1 to 1 |
| 18 | Jaguars represent a high value for promoting ecotourism in Brazil** | -1 to 1 |
| 28 | Brazil has a major international obligation to ensure that jaguars survive** | -1 to 1 |

*Note: Full consensus statements (***) are those statements shared by all three narratives and are within a spread of one narrative ranking. General consensus statements (**) are those statements shared by all three narratives and are between one to two narrative rankings.*

NARRATIVE C.—This tolerant-to-jaguars narrative had the fewest members and comprised the opinions of three individuals working within state institutions for the State of Goias. Two of the institutions worked with issues related to cattle production, whereas the third was an electricity company working with hydropower. The individuals behind narrative C expressed a relatively more bland view of jaguars as a species worthy of conservation than individuals in the previous two narratives. They stressed that the illegal killing of jaguar prey (11) and logging of forests represented major threats to jaguar survival (12), but put less weight on this latter point. To them it was important that decisions about jaguar conservation should not be taken at the local level (29) and they stressed the necessity of scientific knowledge (21). Although jaguars were not seen as a threat to human rights or basic freedoms (4) and the establishment of protected areas for jaguars (27) was seen as imperative, they did not want jaguars to survive throughout the country, including in human-modified landscapes (20). Although jaguars were not considered to be a major threat to the economic viability of cattle ranching (10), the representatives of narrative C recognised that the situation may differ for smallholders or among breeders and did not necessarily think that the killing of jaguars must always be prohibited (23). Rather they were relatively positive towards hunting (24), in contrast to narratives A and B, but said that it would have to be controlled and they opposed indiscriminative killing of jaguars, just as they disagreed with jaguar hunting being an act of bravery and skill (33). Jaguars, just like any other Brazilian animal, were thought to have a right to exist in Brazil (1), but contrary to narrative B, their conservation was not thought to enhance overall biodiversity conservation (25). Jaguars were not seen as crucial for the forest ecosystems (8).

CONSENSUS.—There was a high level of consensus (agreement) among the three narratives. Of the 33 Q statements, I identified 10 consensus statements with a spread of one narrative ranking, in addition to 10 general concurrence statements with a spread of one to two narrative rankings (Tables 3 and 5). Consensus statements were defined as statements for which there was a very high level of agreement among narratives, and general concurrence statements were defined as statements for which there was a high level of agreement among narratives. Narrative rankings ranged from -4, “disagree most” to 4, “agree most” (Fig. 2). The differences among narratives may therefore be described as subtle (Table 4), but not necessarily unimportant. So, to further explore these differences I examined all statements across all three narratives ranked from “neutral” to most agreement and “neural” to most disagreement and found that, in addition to the consensus statements and the general

concurrence statements, people were relatively positive about establishing protected areas for jaguars (27). They thought that jaguar conservation should be primarily based on scientific knowledge (21) and that it was important that future generations of Brazilians should be able to experience jaguars in the wild (7). They also agreed that hunting for jaguars was not an act of bravery and skill (33), and although many interviewees had pointed out the importance of including local people in the decision process, there was general agreement among narratives that decisions about jaguar conservation should not be taken on a local level (29).

INTEREST-INFLUENCE ASSESSMENT.—The narratives provide some insights into which institutions clustered together, based on their opinions and views on jaguar conservation. All the ministries and all three social movements in the stakeholder analysis grouped into the anti-hunting, pro-conservation narrative, narrative A. The ecocentric group, narrative B, was characterised by institutions that engaged with research, either directly or indirectly through finance. Whereas narrative C, which may be described as tolerant towards jaguars, comprised the opinions of representatives from state institutions from Goias, and two of three institutions were linked to cattle production.

To further investigate the institutions and to find out which might be more important for jaguar conservation, based on their interest in, and influence on, jaguar conservation, I examined the interest-influence assessments made by the institutions (Fig. 3). The reference and composite placements for all institutions, within the interest-influence matrix, illustrate how each institution's own representative, and the other institutional actors perceived the institutes' interest in, and influence on jaguar conservation. Also, Fig. 3 clearly illustrates a difference in perceived levels of interest between the self-assessments (reference placements) and the average-assessments (composite placements) made by other institutional actors, as self-assessments generally indicated higher levels of interest in jaguar conservation. For influence however, I detected no particular trends (Fig. 3).

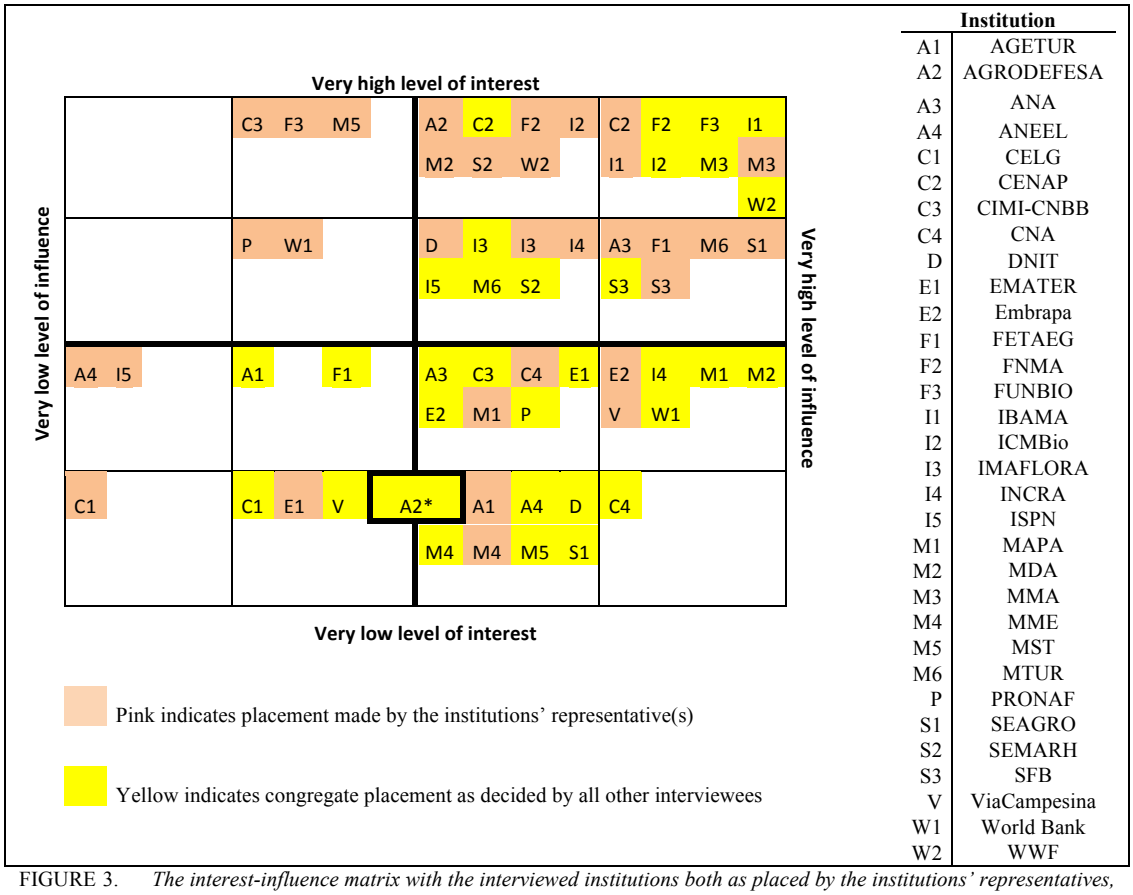


FIGURE 3. *The interest-influence matrix with the interviewed institutions both as placed by the institutions' representatives, reference placements in pink, and the composite placements in yellow, such as decided for by the other interviewees on average. The x-axis illustrates the level of influence and the y-axis the level of interest, which an institution might have in jaguars and jaguar conservation within Goias and Mato Grosso, central Brazil. For each axis there are 4 different levels running from (1) "Very low level" to (2) low level, (3) high level, and (4) "Very high level". Each cell within the matrix thus represents a combination of the level of interest and the level of influence, but the level of interest and influence does not differ within cells.*

**For the composite (average) placement of AGRODEFESA, as decided for by all interviewees but its own representative, AGRODEFESA ended up between to cells, and on a rather low level of influence.*

The total percentage errors (Table 6), which denoted differences in reference and composite placements, gave an indication of how well the assumptions regarding interest and influence corresponded among the references and the other actors. By looking at the coordinates given to the institutions and comparing the self-assessments with the other assessments, I obtained insight into where the disagreements were, *e.g.* in the interest- or influence plane. Where agreement between assessments was greater, and total percentage errors were smaller, I concluded that the institutional representatives viewed their own institutions in the same or similar way as the other interviewees collectively viewed it. Greater total percentage errors thus indicated that the views differed more, either because (1) the representative of a given institution did not appreciate the institutions' actual interest and influence, or (2) that the other institutional actors poorly understood the institutions' actual role. However, assuming that the assessments made by the institutions' representatives (reference placements) and by the other institutional actors (composite placements) were valid

representations of the institutions' interest and influence, summarizing these and calculating the mean coordinate values for each institution gave a measure of the institutions' importance for jaguars (Table 7; Fig. 4).

TABLE 6. *Self-assessment of the interviewees' institutions' interest and influence on jaguar conservation in central Brazil compared to the average assessment by others of the same institute, for all institutions. Scales for the interest and influence planes were divided into four steps, where 1 represents the lowest possible level of interest or influence and 4 represents the highest possible level of interest or influence. The total percentage errors in placements indicate the magnitude of disagreement between the institutions' self-perceptions and how others collectively perceived them (illustrated in Fig.3).*

| **INSTITUTION** | **Assessment by others** | | **Self-assessment (reference)** | | **Difference in influence (others-reference)** | **Difference in interest (others-reference)** | **Euclidean distance** | **Total percentage error in placement** |
|---|---|---|---|---|---|---|---|---|
| | **influence** | **interest** | **influence** | **interest** | | | | |
| **Complete concordance, self-assessment = assessment by others** | | | | | | | | |
| IBAMA | 4 | 4 | 4 | 4 | 0.0 | 0.0 | 0.0 | 0.00% |
| IMAFLORA | 3 | 3 | 3 | 3 | 0.0 | 0.0 | 0.0 | 0.00% |
| MMA | 4 | 4 | 4 | 4 | 0.0 | 0.0 | 0.0 | 0.00% |
| MME | 3 | 1 | 3 | 1 | 0.0 | 0.0 | 0.0 | 0.00% |
| SFB | 4 | 3 | 4 | 3 | 0.0 | 0.0 | 0.0 | 0.00% |
| **Discordance by one cell in one plane** | | | | | | | | |
| CELG | 2 | 1 | 1 | 1 | 1.0 | 0.0 | 1.0 | 17.68% |
| CENAP | 3 | 4 | 4 | 4 | -1.0 | 0.0 | 1.0 | 17.68% |
| Embrapa | 3 | 2 | 4 | 2 | -1.0 | 0.0 | 1.0 | 17.68% |
| FNMA | 4 | 4 | 3 | 4 | 1.0 | 0.0 | 1.0 | 17.68% |
| ICMBio | 4 | 4 | 3 | 4 | 1.0 | 0.0 | 1.0 | 17.68% |
| MAPA | 4 | 2 | 3 | 2 | 1.0 | 0.0 | 1.0 | 17.68% |
| MTUR | 3 | 3 | 4 | 3 | -1.0 | 0.0 | 1.0 | 17.68% |
| SEMARH | 3 | 3 | 3 | 4 | 0.0 | -1.0 | 1.0 | 17.68% |
| WWF | 4 | 4 | 3 | 4 | 1.0 | 0.0 | 1.0 | 17.68% |
| **Discordance by one cell in two planes** | | | | | | | | |
| AGETUR | 2 | 2 | 3 | 1 | -1.0 | 1.0 | 1.4 | 25.00% |
| ANA | 3 | 2 | 4 | 3 | -1.0 | -1.0 | 1.4 | 25.00% |
| CNA | 4 | 1 | 3 | 2 | 1.0 | -1.0 | 1.4 | 25.00% |
| EMATER | 3 | 2 | 2 | 1 | 1.0 | 1.0 | 1.4 | 25.00% |
| INCRA | 4 | 2 | 3 | 3 | 1.0 | -1.0 | 1.4 | 25.00% |
| PRONAF | 3 | 2 | 2 | 3 | 1.0 | -1.0 | 1.4 | 25.00% |
| **Discordance by two cells in one plane** | | | | | | | | |
| DNIT | 3 | 1 | 3 | 3 | 0.0 | -2.0 | 2.0 | 35.36% |
| FUNBIO | 4 | 4 | 2 | 4 | 2.0 | 0.0 | 2.0 | 35.36% |
| **Discordance by one cell in one plane and two cells in the other plane** | | | | | | | | |
| ANEEL | 3 | 1 | 1 | 2 | 2.0 | -1.0 | 2.2 | 39.53% |
| CIMI-CNBB | 3 | 2 | 2 | 4 | 1.0 | -2.0 | 2.2 | 39.53% |
| FETAEG | 2 | 2 | 4 | 3 | -2.0 | -1.0 | 2.2 | 39.53% |
| ISPN | 3 | 3 | 1 | 2 | 2.0 | 1.0 | 2.2 | 39.53% |
| MDA | 4 | 2 | 3 | 4 | 1.0 | -2.0 | 2.2 | 39.53% |
| SEAGRO | 3 | 1 | 4 | 3 | -1.0 | -2.0 | 2.2 | 39.53% |
| Via-Campesina | 2 | 1 | 4 | 2 | -2.0 | -1.0 | 2.2 | 39.53% |
| WB | 4 | 2 | 2 | 3 | 2.0 | -1.0 | 2.2 | 39.53% |
| **Complete discordance in one plane and discordance by 0.5-1 cell in the other plane** | | | | | | | | |
| AGRODEFESA | 2.5 | 1 | 3 | 4 | -0.5 | -3.0 | 9.0 | 53.76% |
| MST | 3 | 1 | 2 | 4 | 1.0 | -3.0 | 9.0 | 55.90% |

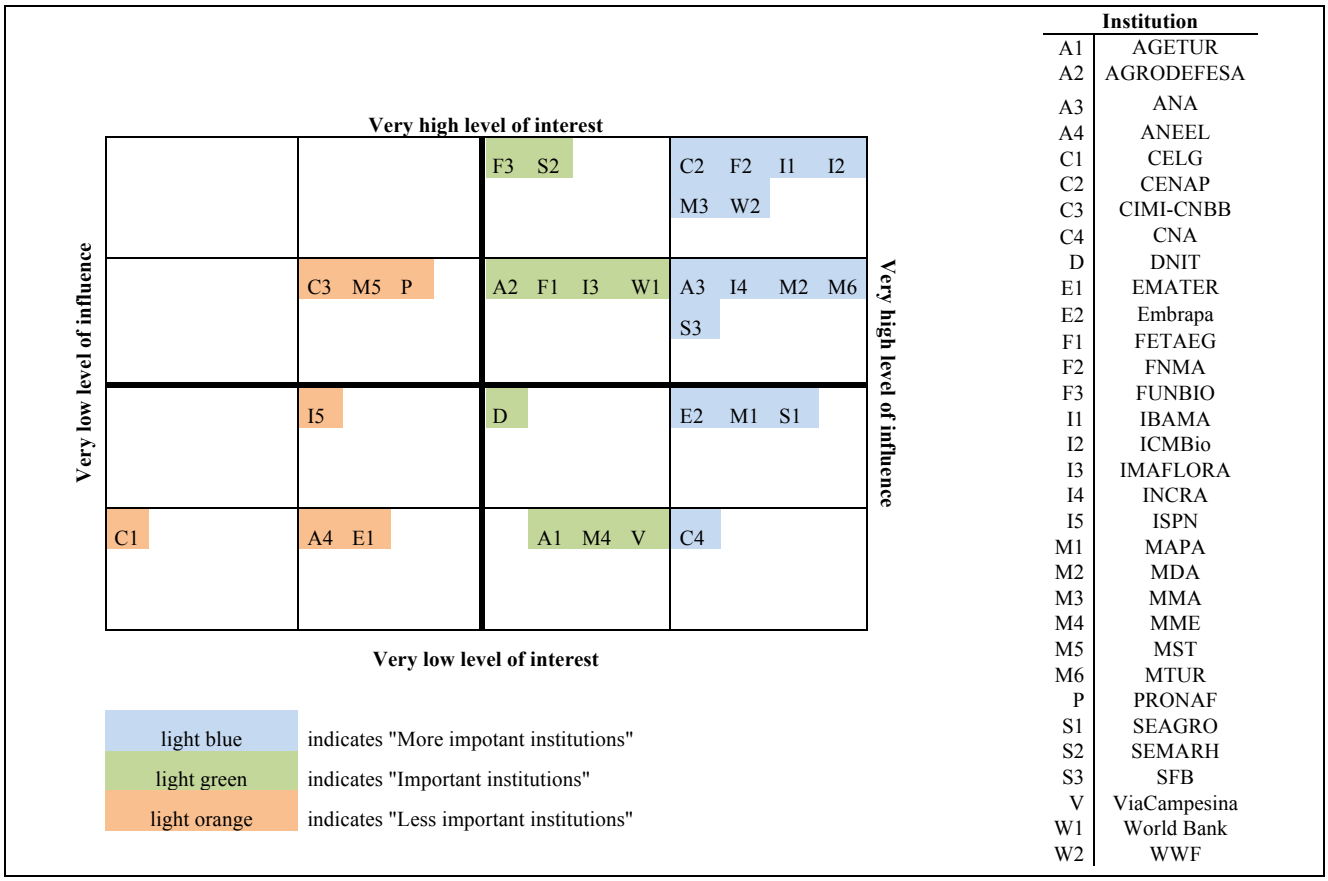


FIGURE 4. *The interest-influence matrix with the interviewed institutions as placed based on the combined perceptions held both by the institutions' own representatives and the other institutional actors on average, where both assessments were of equal importance. The x-axis illustrates the level of influence and the y-axis the level of interest, which an institution might have in jaguars and jaguar conservation within Goias and Mato Grosso, central Brazil. For each axis there are 4 different levels running from (1) "Very low level" to (2) low level, (3) high level, and (4) "Very high level". Each cell within the matrix thus represents a combination of the level of interest and the level of influence, but the level of interest and influence does not differ within cells. Colour codes are in accordance with the institutions' relative importance for jaguar conservation in Goias and Mato Grosso (Table 6). "More important institutions" are blue, "Important institutions" are green and "Less important institutions" are orange.*

Combining the information provided (Tables 2 and 7; Fig. 4), I obtained an indication of which narrative was most important with respect to the influence attributed to the stakeholders, whose opinions make up the narratives (Table 8). The anti-hunting, pro-conservation narrative (A) had most representatives from the "More important institutions" and also most representatives from the "Important institutions". Subsequently, this narrative appeared to be most important, both in terms of the number of representatives and also in terms of influential representatives. The second most important group in terms of influential institutions was the one that did not load significantly on any narrative. However the second most important narrative in terms of "More important" and "Important" institutions was also the second most important narrative in terms of the number of members, namely the ecocentric narrative (B). The tolerant-towards-jaguars narrative (C) subsequently carried less importance compared to the other two narratives, both in terms of the number of representatives and their influence on jaguar conservation. The "Less important institutions"

were evenly distributed among the three narratives and the group that did not load significantly on any narrative, with two institutions in each group.

TABLE 7. *Hierarchical ordering of the institutions' importance for jaguar conservation in the states of Goias and Mato Grosso, central Brazil, primarily based on the institutions' influence on jaguar conservation, both as seen by the institution's own representative and the other institutional actors (on average), where both assessments are of equal importance. Secondly, ranking within groups build on the institutions' interest in jaguar conservation as perceived by the institutions' own representatives and the other institutional actors (on average), where both assessments were of equal importance.*

| Institution | New composite assessment | |
|---|---|---|
| | Influence | Interest |
| **More important institutions (very high level of influence and varying level of interest):** | | |
| CENAP ** | 4 | 4 |
| FNMA** | 4 | 4 |
| IBAMA*** | 4 | 4 |
| ICMBio** | 4 | 4 |
| MMA*** | 4 | 4 |
| WWF** | 4 | 4 |
| ANA | 4 | 3 |
| INCRA | 4 | 3 |
| MDA | 4 | 3 |
| MTUR** | 4 | 3 |
| SFB*** | 4 | 3 |
| Embrapa** | 4 | 2 |
| MAPA** | 4 | 2 |
| SEAGRO | 4 | 2 |
| CNA | 4 | 1 |
| **Important institutions (high level of influence and varying level of interest):** | | |
| FUNBIO | 3 | 4 |
| SEMARH** | 3 | 4 |
| AGRODEFESA | 3 | 3 |
| FETAEG | 3 | 3 |
| IMAFLORA*** | 3 | 3 |
| WB | 3 | 3 |
| DNIT | 3 | 2 |
| AGETUR | 3 | 1 |
| MME*** | 3 | 1 |
| Via-Campesina | 3 | 1 |
| **Less important institutions (relatively less high level of influence and varying level of interest):** | | |
| CIMI-CNBB | 2 | 3 |
| MST | 2 | 3 |
| PRONAF | 2 | 3 |
| ISPN | 2 | 2 |
| ANEEL | 2 | 1 |
| EMATER | 2 | 1 |
| CELG** | 1 | 1 |

**** Indicates consensus in perceptions of an institution's interest and influence on jaguar conservation both as perceived by other institutional actors and by the institution's own representative, and with a maximum total displacement error of 0.00% (Table 6).*
*** Indicate general concurrence in perceptions of an institution's interest and influence on jaguar conservation both as perceived by other institutional actors and by the institution's own representative, and with a maximum total displacement error of 17.68% (Table 6).*

The findings that I have thus far presented for the interest-influence matrix are all based on the comparison of assessments made by the institutions' representatives and the average assessments made by all other interviewees for the same institutions. However, to obtain a more exact measure of how well any institution's assessment of its own interest and influence corresponded to those of all the other's for the same institution, I examined the

assessments of interest and influence separately. I used a Chi-square test to calculate all the p values for both the interest and influence assessments. The resulting values for the 32 institutions demonstrate three different groups (Table 9). The first and largest group, which comprised 30 out of the 32 interviewed institutions, was composed of institutions for which the assessments were significantly different both in terms of interest and influence. For the second group, in which IBAMA was found, the assessments of the institution's interest significantly differed, whereas the assessments of influence did not significantly differ among the other actors. For the third group, comprised by ICMBio, the assessments of ICMBio's interest did not significantly differ among the interviewees, whereas the assessments of influence significantly did differ. Summing up, with the exception of two instances, institutions viewed themselves significantly differently from the other actors. Suggesting that there was a poor understanding between stakeholder institutions for the positions that they had.

TABLE 8. *Combining the information about stakeholders' importance for jaguar conservation in Goias and Mato Grosso, central Brazil, based on their influence (Table 7), and the clusters of stakeholders whose opinions make up narratives A; anti-hunting, pro-conservation, B; ecocentric and C; tolerant-towards-jaguars, respectively (Table 2) shows the narratives' relative importance. Here hierarchically ordered with the most important narrative at the top, the anti-hunting, pro-conservation narrative (A). Also the group of institutions, which did not load significantly on any narrative (Table 2), is shown. The numbers illustrate the distribution of institutions among the different categories of importance (Table 7) for the three narratives and the group without a narrative (Table 2), and are based on the 34 interviews.*

| **Category of importance** | **Number of institutions in each category** | **Proportion of total (within a given category)** | **Percentage of total (within a given category)** | **Proportion of total (within a given narrative)** | **Percentage of total (within a given narrative)** |
|---|---|---|---|---|---|
| **Narrative A** (14 representatives) | | | | | |
| More important institutions | 7 | 7/15 | 46.67% | 7/14 | 50% |
| Important institutions | 5 | 5/11 | 45.45% | 5/14 | 36% |
| Less important institutions | 2 | 2/8 | 25% | 2/14 | 14% |
| **Narrative B** (7 representatives) | | | | | |
| More important institutions | 3 | 3/15 | 20% | 3/7 | 43% |
| Important institutions | 2 | 2/11 | 18.18% | 2/7 | 28.5% |
| Less important institutions | 2 | 2/8 | 25% | 2/7 | 28.5% |
| **Narrative C** (3 representatives) | | | | | |
| More important institutions | 1 | 1/15 | 6.67% | 1/3 | 33% |
| Important institutions | 0 | 0/11 | 0% | 0 | 0% |
| Less important institutions | 2 | 2/8 | 25% | 2/3 | 67% |
| **No narrative** (10 interviewees) | | | | | |
| More important institutions | 4 | 4/15 | 26.67% | 4/10 | 40% |
| Important institutions | 4 | 4/11 | 36.36% | 4/10 | 40% |
| Less important institutions | 2 | 2/8 | 25% | 2/10 | 20% |

TABLE 9. *Comparing all reference placements with those of all other interviewees, for interest and influence on jaguar conservation in central Brazil respectively, and for all the institutions, shows the institutions that were viewed significantly differently by other institutions than they viewed themselves. A significant difference between reference placement and the other placements implies Chi-square p < 0.05, at 95% CI. For a more detailed description of the institutions, see Table 1.*

| Institution | Category | Chi-square p-value, interest | Chi-square p-value, influence |
|---|---|---|---|
| **Significantly different for both interest and influence** | | | |
| AGETUR | Tourism | 5.28E-10* | 6.02E-05* |
| AGRODEFESA | Cattle producers | 4.70E-13* | 1.96E-07* |
| ANA | Hydropower | 4.68E-11* | 3.26E-08* |
| ANEEL | Hydropower | 7.10E-07* | 7.30E-09* |
| CELG | Hydropower | 0.0004062* | 2.45E-07* |
| CENAP | NGOs / Scientists | 0.01534* | 3.32E-06* |
| CIMI-CNBB | Landless / Indigenous people | 1.17E-07* | 1.17E-07* |
| CNA | Cattle producers | 1.98E-10* | 2.88E-09* |
| DNIT | Transport | 1.02E-11* | 9.96E-09* |
| EMATER | Cattle producers | 3.26E-08* | 9.96E-09* |
| Embrapa | Agriculture | 8.45E-07* | 2.88E-09* |
| FETAEG | Agriculture | 5.18E-10* | 5.18E-10* |
| FNMA | Finance | 8.45E-07* | 8.45E-07* |
| FUNBIO | Finance | 0.00785* | 7.36E-11* |
| IMAFLORA | Forestry | 1.17E-07* | 2.39E-05* |
| INCRA | Agriculture | 1.98E-10* | 2.99E-07* |
| ISPN | NGOs / Scientists | 5.48E-07* | 1.00E-08* |
| MAPA | Agriculture | 1.01E-07* | 1.01E-07* |
| MDA | Agriculture | 4.68E-11* | 1.01E-07* |
| MMA | Environmental institutions management / government | 0.03201* | 0.03201* |
| MME | Hydropower | 5.95E-06* | 7.80E-10* |
| MST | Landless / Indigenous people | 3.75E-13* | 7.80E-10* |
| MTUR | Tourism | 2.88E-09* | 7.80E-10* |
| PRONAF | Finance | 2.05E-12* | 2.88E-09* |
| SEAGRO | Cattle producers | 1.24E-10* | 2.49E-08* |
| SEMARH | Environmental institutions management / government | 2.88E-09* | 1.01E-07* |
| SFB | Forestry | 1.97E-06* | 1.34E-05* |
| Vía Campesina | Landless / Indigenous people | 8.59E-08* | 6.03E-09* |
| World Bank | Finance | 1.85E-08* | 2.81E-12* |
| WWF | NGOs / Scientists | 0.003823* | 5.87E-07* |
| **Significantly different for interest, not influence** | | | |
| IBAMA | Environmental institutions management / government | 0.01626* | 0.2369 |
| **Significantly different for influence, not interest** | | | |
| ICMBio | NGOs / Scientists | 0.4723 | 5.57E-12* |

**indicates significant p value*

## DISCUSSION

THE METHOD PERFORMANCE.—Some of the advantages with Q methodology were that it allowed me to identify narratives following a statistically sound analysis, in contrast to many other narrative analyses. At the same time it still allowed for a relatively qualitative analysis when combining the results from the sorting exercises with the follow-up interviews, and permitted the extraction of clear narratives. Its card-game design was also more tangible than other, traditional interviewschemes and the game format created a greater interest in the project among the interviewees, who found the Q sort both "interesting" and "fun" to "play". However, some of the obvious disadvantages of Q methodology were that it required a lot of time for the design and the interviews. The results are also directly dependent on the statements that I chose, including my formulations and translation, my selection of

interviewees, and ability to interpret the resulting narratives. Also the validity of the narratives depend on the interviewees' willingness to reflect openly and order Q statements truthfully in accordance with their views on jaguars, although these caveats exist for all interview methods.

Due to a limited response from some categorical groups, *e.g.* "Transport" and "Forestry", these are underrepresented. I was also unable to include any state institutions from Mato Grosso and therefore results are skewed to better reflect the situation in Goias, although all interviews focused on both Goias and Mato Grosso. Another disadvantage, incurred by the nature of Q, was that the sample size for the stakeholder analysis could not have been much greater than it already was, because there should ideally not be more variation than there are observations in the analysis. Hence, for this particular Q sampling, there should not be more than a maximum of 33 Q sorts (interviewees), should it be repeated. Noteworthy is also how some of the variation in the answers was lost through the analysis, as those individuals whose sorts did not load significantly on any narrative were withdrawn from the rest of the analysis. Therefore 32 per cent of the total variation was lost, although this in itself should be viewed as a result.

The interest-influence assessment was also designed in a game-like manner, which stimulated enthusiasm among the interviewees. As a result of the visual and tangible format of the exercise, most persons seemed able to assess the institutions in a more holistic manner, with respect to jaguar conservation. As it were, they could actually see the resulting web of institutions that they had created and were able to revisit and revaluate the institutions that appeared to be in a "wrong" position when they saw their placements in relation to the other institutions, thus prompting the participants to contemplate the institutions in a thoughtful way. However, as this exercise is normally meant as an auxiliary to help researchers assess which actors to involve in a stakeholder analysis, there were no available statistical tools that had previously been used to analyse the results of such an exercise. This implied that I had to adopt all assessment tools without reference to previous interest-influence analyses and with the obvious drawback that no one has checked if these tests really were the best means for the analysis. In parallel, the broad scope of this study and the diverse spectra of different institutions further complicated the evaluation of the interview results. For the Chi-square it could therefore have been interesting to evaluate the perceptions within each stakeholder category to see if views were more similar within these, compared to the current evaluation of perceptions among all actors from all the categories. It is also important to note that the Chi-square test and the other tests used to evaluate the interest-influence matrix are

fundamentally different. Not only do they evaluate the assessments very differently, but as a result, the end products must also be interpreted differently. Therefore, even if the total percentage errors between self and composite (average) assessments indicate a reasonable agreement between the two in some cases, the Chi-square test could still show that when all individual assessments for every institution are compared, assessments are significantly different. Another limitation to the interest-influence exercise was that I had to decide on all the stakeholder institutions to be assessed prior to the interviews. I was accordingly unable to supplement the sample set with new institutions after I had begun the interviews, even if I discovered that important actors, which should have been part of the stakeholder analysis, had been left out. This highlighted the importance of a rigorous background work.

THE FINDINGS WITH RESPECT TO JAGUARS.—The first aim of the stakeholder analysis was to identify the most important institutional actors for successful jaguar conservation in Goias and Mato Grosso, central Brazil. I identified nine different categorical groups of stakeholder institutions that potentially influenced jaguars, were influenced by jaguars, or both. For each of these categorical groups, I chose the most important institutes in regard to their potential influence within the states of focus, and included 32 institutes in the stakeholder analysis.

The second aim of the study was to understand these institutional actors' attitudes towards jaguar conservation in Goias and Mato Grosso and to uncover the different narratives that existed among them about jaguar conservation. Through a Q analysis I identified three narratives, each revealing which the most important topics for jaguar conservation were, within the corresponding narratives. The Q analysis also showed that there was a high level of agreement on the important topics among stakeholder institutions and among narratives. Noteworthy was the strong agreement about jaguars' right to exist in Brazil, which was fundamental to all three narratives. In addition, all narratives strongly agreed that jaguars were not a threat, nor an obstacle, to the economic viability of cattle ranching, the economic development of Brazil, nor Brazil's rural development. There were however, some subtle but important disagreements among the narratives that I would like to highlight here, as they may be important for successful jaguar conservation.

Firstly, hunting in general and jaguar hunting in particular were very controversial topics among the three narratives. Representatives from the anti-hunting, pro-conservation narrative (A) completely disagreed with the killing of jaguars, under all conditions, and were strongly opposed to retaliatory killing by cattle ranchers. The ecocentric narrative (B) expressed a neutral view towards lifting the prohibition of jaguar killing, but its

representatives were negative towards retaliatory killing. The representatives of the tolerant-towards-jaguars narrative (C), on the contrary, were positive towards changing the law on jaguar killing, on the condition that hunting should be strictly controlled. They also recognized that the situations may differ for smallholders and among cattle breeders, and thought that cattle ranchers should be allowed to kill jaguars that kill cattle, although not indiscriminately. As to whether jaguars should be allowed to survive throughout Brazil, including in human-modified landscapes, there was clear disagreement among the three narratives. The representatives of the ecocentric narrative (B) thought that jaguars should be allowed to survive throughout the country, including in human-modified landscapes, representatives for the anti-hunting, pro-conservation narrative (A) were neutral and the representatives of the tolerant-towards-jaguars narrative (C) strongly opposed the idea. Additionally there was much disagreement around the perceptions of illegal killing of jaguar prey. Both representatives from narratives A and C perceived this as one of the most important threats to jaguar conservation, whereas it was not at all considered to be a threat to jaguars within the ecocentric narrative (B). There was also a clear divide among narratives regarding the notion of jaguar conservation as a flagship for overall biodiversity conservation. Within the ecocentric narrative (B) it was very central that jaguar conservation would also conserve many other species. Although the representatives of the anti-hunting, pro-conservation narrative (A) agreed with those of the ecocentric narrative (B), this was given much less importance by them, and for the tolerant-towards-jaguars narrative (C) this was not at all the case. A final difference among narratives, which could be important to keep in mind for successful jaguar conservation, concerned the perceptions of the impacts of hydropower. Within the anti-hunting, pro-conservation narrative (A) hydropower was not seen as a threat but both the representatives from the ecocentric narrative (B) and the tolerant-towards-jaguars narrative (C) agreed that the development of hydropower was in conflict with the protection of jaguar habitats.

Other issues that were treated slightly differently among the narratives and which may therefore deserve attention with regard to successful jaguar conservation, include local decision-making, the concept of jaguar hunting as an act of bravery and skill, the status of scientific knowledge in decision-making, and the establishment of protected areas. For the anti-hunting, pro-conservation narrative (A) and the tolerant-towards-jaguars narrative (C), the representatives agreed that decisions about jaguar conservation should not be taken on the local level and that jaguar hunting was not an act of bravely and skill. Within the ecocentric narrative (B), both of these conceptions were seen in a neutral light. Although all three

narratives agreed that it was important to establish protected areas for jaguars, the issue was more highly prioritized within narratives A and C, and received relatively less importance within the ecocentric narrative (B). Scientific knowledge was more highly valued within narratives A and B than in the tolerant-towards-jaguars narrative (C), however.

These findings suggest the presence of certain political and social divisions within the Brazilian jaguar debate. For instance, the divide among narratives about hunting, which on a national basis is strictly forbidden for all wildlife species with very few exceptions under special circumstances, shows that there were issues that stakeholder institutions clearly perceived very differently. Those who were most open towards a slight lift in the regulations about jaguar hunting came from state institutions from Goias and two of three institutions were linked to cattle production. Institutions that engaged with research, either directly or indirectly through finance, were mostly neutral towards a lift in the regulations. Those against a lift in the hunting regulations included all the ministries, and all three social movements in the stakeholder analysis. These findings suggest a possible divide among institutes on different political scales with some local state institutions for Goias on the one side, national ministries on the other, and with researches in the middle.

Also a clear divide could be observed in relation to where jaguars should be allowed to survive, roughly among those linked to cattle production, research and national governance. The representatives of the Brazilian government and the three social movements were relatively neutral towards allowing jaguars to survive throughout the country, including in human-modified landscapes, those involved with research were for and those linked to cattle production were against. This suggests differences in political, social, and/or emotional motives. Cattle farmers, for example, would have to "directly live with" the jaguars, the economic losses, and possible emotional distress that these may provoke. Researchers, perhaps especially environmental scientists, would probably have a more distanced and possibly holistic ecological view, where jaguars could form an important part of natural systems. Politicians would be in the middle and would have to see to both the needs of the agricultural sector, including cattle farming, and the environmental sector.

Regarding hydropower, however, the institutions linked to research and cattle farming seemed to group against the social movements and the Brazilian government, who did not see the development of hydroelectric power plants as a source of conflict for the conservation of jaguar habitat. Thus, this divide possibly alludes to the presence of additional politicized discourses within the Brazilian context that could influence the conservation of jaguar habitat.

The third goal of the study was to evaluate the power relationships among stakeholder institutions. The results from the interest-influence analysis were mixed. Comparing the perceptions that interviewees held of their own institutions with the average assessments, made by the other actors, for the same institutes, revealed a general mismatch in assessments, principally for "interest". Although many institutions' self and composite (average) assessments seemed to be in reasonable agreement, many were not. However, the Chi-square test and separate evaluation of interest and influence gave a clear indication of a profound mismatch in perceptions between institutional actors and suggested that the understandings between actors of their different relative roles, with respect to jaguars, were poor. These results are worrying, yet not necessarily surprising taking into account the very broad spectra of institutions that were involved in the stakeholder analysis. However, the possible implications this holds for jaguars and their conservation could be serious. If the more important stakeholder institutions do not appreciate their roles in jaguar preservation, or do not understand who the other important players are, they may not adequately assume their responsibilities or take adequate actions with respect to jaguars. In addition, they might not be able to cooperate with the appropriate partners.

The combined self and composite assessments, which allowed for a hierarchical differentiation among institutions based on their interest and influence, also gave some indication of which institutions might be relatively more important for jaguar conservation in Goias and Mato Grosso. Combined with the information about the institutional clusters from the three narratives, A, B and C, this suggested that the anti-hunting, pro-conservation narrative (A) would be relatively more important for jaguar conservation, as this narrative not only had most representatives in general, but also had more influential representatives compared to the other two narratives.

WIDER IMPLICATIONS.— Previous attitude studies about large carnivores have found a correlation between negative attitudes towards large carnivores and low levels of education, economic losses incurred by carnivores, the distance to carnivores, and the size of the community in which people live (Kleiven *et al*., 2004, Røskaft *et al*., 2007, Karlsson and Sjöström, 2007, Jalais, 2008). In support of these findings, interviewees from my study, who were generally well educated (coming from top positions within national and State institutions) and relatively far removed from any carnivore conflicts on the ground (as they lived and worked in very large urban communities) were positive towards the existence of jaguars in Brazil, as illustrated by the narratives. These same representatives also did not see

jaguars as a threat to humans, although other attitude studies about jaguars in Brazil have shown that people who live with jaguars in their proximity do express fear of jaguars (Confortia and Cascelli de Azevedoa, 2003, Santos *et al*., 2008).

Furthermore, in my study, attitudes towards legalising jaguar hunting varied considerably. Typically those who were more positive towards legal jaguar killing represented stakeholders who live closer to jaguars and who would also be more directly affected by jaguars. Those who were less favourable towards lifting the present regulations represented institutions that were further removed from jaguar conflicts on the ground and already enjoyed relatively more influence over management. Once again, this suggested a possible importance of distance on peoples' perceptions about jaguars, but also the importance of influence over decision-making.

In fact, other large carnivore studies have shown that large carnivores, for many people, become sybolic of hedgemony as well as oppresion from authorites (Heikkinen *et al.*, 2011, Moore, 1994). The feeling of ownership among stakeholders could therefore be important for successful conservation work. Although the interviewees in my case study were generally negative towards the devolution of power through for example licensed jaguar hunting or local-decision making, others have found that devolving power over jaguar conservation might be a "potent ingredient" for successful jaguar conservation (Cavalcanti *et al.*, 2010). In a Swedish attitude study about the acceptance of wolves (*Canis lupus*), Sjölander-Lindqvist (2006) reported that licensed wolf hunting could contribute to a wider acceptance of wolves among the rural population and would grant the rural population a feeling of ownership over wolf management.

Additionally, fostering understanding and respect among actors is important for successful conservation work (Byrd, 2002), and the function of institutions and their actions should be comprehensible to the public (Kleiven *et al*., 2004). However, the results from the interest-influence exercise in this study indicated a generally poor understanding among stakeholder institutions of their different roles with regard to jaguar conservation. This highlights an area that could be particularly important for effective jaguar conservation, namely the need for better communication among stakeholders. Indeed, studies where stakeholders' understandings of each other's perspectives have been poor, have revealed high levels of conflicts over conservation issues (Heikkinen *et al*., 2011). Conservation strategies must therefore include all stakeholders, at all levels, and the effects of conservation strategies over long time must be considered (Diemonta *et al*., 2011, Hoogesteijn and Hoogesteijn, 2010, Ervine, 2010, Spring *et al.*, 2010, Hayes, 2008, Rivera *et al.*, 2002). Additionally, since

the conservation of biodiversity in other places has been impaired by poor community involvement and also prevailing poverty levels have threatened the sustainability of conservation efforts, (Ervine, 2010, Hayes, 2008, The World Bank, 2011) local conditions and community involvement should also be considered in future conservation work.

## ACKNOWLEDGEMENTS

I thank John Linnell from the Norwegian Institute of Nature Research and Jon Swenson from the Department of Ecology and Natural Resource Management at the Norwegian University of Life Sciences for the opportunity to participate in this project about jaguar conservation in Brazil. I also thank them for their support, revision and suggestions for the final version of this paper. I acknowledge the Norwegian Research Council for financing the project and not least I also acknowledge and thank all of those who have participated and helped in this study. In particular I would like to thank Leandro Silveira and Natália M. Tôrres from the Jaguar Conservation Fund, and Ary Soars dos Santos from the Brazilian Institute for Environment and Renewable Natural Resources.

## LITERATURE CITED

BARRY, J. & PROOPS, J. 1999. Seeking Sustainability discourses with Q methodology. *Ecological Economics,* 28**,** 337-345.

BROWN, S., R. 1980. *Political Subjectivity, Application of Q Methodology in political Science*, Yale University.

BROWN, S., R. 1993. A Primer on Q Methodology. *Operant Subjectivity,* 16**,** 91-138.

BURTON, M. 1962. *Systematic dictionary of mammals of the world,* London.

BYRD, K. 2002. Mirrors and Metaphors: Contemporary Narratives of the Wolf in Minnesota. *Ethics, Place and Environment,* 5 50 – 65.

CARDILLO, M., PURVIS, A., SECHREST, W., GITTLEMAN, J., L., BIELBY, J. & MACE, G., M. 2004. Human Population Density and Extinction Risk in the World's Carnivores. *PLoS Biology,* 2**,** 0909-0914.

CASCELLI DE AZEVEDO, F., CESAR & MURRAY, D., L. 2007. Evaluation of Potential Factors Predisposing Livestock to Predation by Jaguars. *Journal of Wildlife Management* 71**,** 2379–2386.

CAVALCANTI, S. M. C., MARCHINI, S., ZIMMERMANN, A., GESE, E. M. & MACDONALD, D. W. 2010. Jaguars, livestock, and people in Brazil: realities and perceptions behind the conflict. *In:* MACDONALD, D. & LOVERIDGE, A. (eds.) *The biology and conservation of wild felids.* Oxford, United Kingdome: Oxford University Press.

CONFORTIA, A., VALÉRIA & CASCELLI DE AZEVEDOA, C., FERNANDO 2003. Local perceptions of jaguars (Panthera onca) and pumas (Puma concolor) in the Iguac¸u National Park area, south Brazil. *Biological Conservation* 111 215–221.

COSTA, F., P. & REHMAN, T. 1999. Exploring the link between farmers' objectives and the phenomenon of pasture degradation in the beef production systems of Central Brazil. *Agricultural Systems,* 61**,** 135-146.

DICKMAN, A., J. 2010. Complexities of conflict: the importance of considering social factors for effectively resolving human-wildlife conflict. *Animal Conservation***,** 458-466.

DIEMONTA, S. A. W., BOHNA, J. L., RAYOMEA, D. D., KELSENA, S. J. & CHENGC, K. 2011. Comparisons of Mayan forest management, restoration, and conservation. *Forest Ecology and Management,* 261**,** 1696-1705.

DU TOIT, J., KOCK, R. & DEUTSCH, J. (eds.) 2010. *Wild Rangelands: Conserving Wildlife While Maintaining Livestock in Semi-Arid Ecosystems,* Hoboken: Wiley-Blackwell.

ERVINE, K. 2010. Participation Denied: the Global Environment Facility, its universal blueprint, and the Mexico- Mesoamerican Biological Corridor in Chipas. *Third World Quarterly,* 31**,** 773-790.

FEARNSIDE, P., MARTIN, RIGHI, C., ABBUD, LIMA DE ALENCASTRO GRAÇA, P., MAURÍCIO, KEIZER, E., W., H., CERRI, C., CLEMENTE, NOGUEIRA, E., MELO & BARBOSA, R., IMBROZIO 2009. Biomass and greenhouse-gas emissions from land-use change in Brazil's Amazonian "arc of deforestation": The states of Mato Grosso and Rondônia. *Forest Ecology and Management,* 258**,** 1968-1978.

FUNDAÇÃO NACIONAL DO ÍNDIO - FUNAI. Available: http://www.funai.gov.br/index.html [Accessed March 9 2012].

GRUBER, J., S. 2011. Perspectives of Effective and Sustainable Community-based Natural Resource Management: An Application of Q Methodology to Forest Projects. *Conservation & Society,* 9**,** 159-171.

HAMES, R. 2007. The Ecologically Noble Savage Debate. *Annual Review of Anthropology,* 36**,** 177-190.

HARMSEN, B. J., FOSTER, R. J., SILVER, S. C., OSTRO, L. E. T. & DONCASTER, C. P. 2010. Jaguar and puma activity patterns in relation to their main prey *Mammalian Biology - Zeitschrift fur Saugetierkunde*.

HAYES, T. M. 2008. The Robustness of Indigenous Common-property Systems to Frontier Expansion: Institutional Interplay in the Mosquitia Forest Corridor. *Conservation & Society,* 6**,** 117-129.

HEIKKINEN, H., MOILANEN, O., NUTTALL, M. & SARKKI, S. 2011. Managing predators, managing reindeer: contested conceptions of predator policies in Finland's southeast reindeer herding area. *Polar Record,* 47**,** 218-230.

HOOGESTEIJN, R. & HOOGESTEIJN, A. 2010. Conserving Wild Felids in Humanized Landscapes. *Wild Felid Monitor,* 3**,** 9-13.

INDEXMUNDI. 2011. Available: http://www.indexmundi.com/brazil/population_growth_rate.html [Accessed March 9 2012].

INSKIP, C. & ZIMMERMANN, A. 2009. Human-felid conflict: a review of patterns and priorities worldwide. *Fauna and Flora International, Oryx,* 43**,** 18-34.

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. Available: http://www.ibge.gov.br/home/ [Accessed March 9 2012].

IUCN. 2011. *IUCN Red List of Threatened Species. Version 2011.2* [Online]. <http://www.iucnredlist.org>. [Accessed 5th of March 2012].

JALAIS, A. 2008. Unmasking the Cosmopolitan Tiger. *Nature and Culture,* 3**,** 25-40.

JEPSON, W. 2005. A disappearing biome? Reconsidering land-cover change in the Brazilian savanna. *The Geographical Journal,* 171**,** 99–111.

KARLSSON, J. & SJÖSTRÖM, M. 2007. Human attitudes towards wolves, a matter of distance. *Biological Conservation,* 137**,** 610-616.

KLEIVEN, J., BJERKE, T. & KALTENBORN, B., P. 2004. Factors influencing the social acceptability of large carnivore behaviours. *Biodiversity and Conservation,* 13**,** 1647-1658.

LEMELIN, R., HARVEY 2009. Doubting Thomases and the Cougar: The Perceptions of Puma Management in Northern Ontario, Canada. *Sociologia Ruralis* 49.

MADHUSUDAN, M., D. 2003. Living Amidst Large Wildlife: Livestock and Crop Depredation by Large Mammals in the Interior Villages of Bhadra Tiger Reserve, South India. *Evironmental Management,* 31**,** 466–475.

MARKER, L. & DICKMAN, A. 2004. Human Aspects of Cheetah Conservation: Lessons Learned from the Namibian Farmlands. *Human Dimensions of Wildlife,* 9**,** 297-305.

MICHALSKI, F., BOULHOSA, R., L., P., FARIA, A. & PERES, C., A. 2005. Human-wildlife conflicts in a fragmented Amazonian forest landscape: determinants of large felid depredation on livestock. *Animal Conservation,* 9**,** 179-188.

MOORE, R. 1994. Metaphors of Encroachment: Hunting for Wolves on a Central Greek Mountain. *Anthropological Quarterly,* 67**,** 81-88.

POLISAR, J., MAXITB, I., SCOGNAMILLOB, D., FARRELL, L., SUNQUIST, M. E. & EISENBERG, J. F. 2003. Jaguars, pumas, their prey base, and cattle ranching: ecological interpretations of a management problem. *Biological Conservation,* 109**,** 297-310.

QUIGLEY, H., B. & CRAWSHAW, J., PETER, G. 1992. A conservation plan for the jaguar Panthera onca in the Pantanal region of Brazil. *Biological Conservation,* 61**,** 149-157.

RABINOWITZ, A. & ZELLER, K. A. 2010. A range-wide model of landscape connectivity and conservation for the jaguar, Panthera onca *Biological Conservation,* 143**,** 939 - 945.

RIVERA, V. S., MADRIGAL, P., CRUZ, I. A. & BORRÁS, M. F. 2002. The Mesoamerican Biological Corridor and local participation. *Parks,* 12**,** 42-54.

RØSKAFT, E., HÄNDEL, B., BJERKE, T. & KALTENBORN, B., P. 2007. Human attitudes towards large carnivores in Norway. *Wildlife Biology,* 13**,** 172-185.

SANO, E., EYJI, ROSA, R., SILVA BRITO, J., LUÍS & GUIMARÃES FERREIRA, L. 2007. Mapeamento de Cobertura Vegetal do Bioma Cerrado: estratégias e resultados. Planaltina: Empresa Brasileira de Pesquisa Agropecuária Embrapa Cerrados "Ministério da Agricultura, Pecuária e Abastecimento".

SANTOS, F. R. D., JÁCOMO, A. T. D. A. & SILVERA, L. 2008. Humans and Jaguars in Five Brazilian Biomes: Same Country, Different Perceptions. *Cat News***,** 21 - 25.

SCHMOLCK, P. 2012. *The QMethod Page* [Online]. Munich: University of the Federal Armed Forces Munich, Department of Education. Available: http://www.lrz.de/~schmolck/qmethod/index.htm [Accessed 6th of March 2012].

SEMB-JOHANSSON, A. & MACDONALD, D. 1985. *Rovdyr,* Oslo, Den norske Bokklubben.

SINGH, A., KUMAR, SINGH, R., R. & CHOWDHURY, S. 2002. Human-elephant conflicts in changed landscapes of south West Bengal, India. *Indian forester,* 128**,** 1119-1132.

SJÖLANDER-LINDQVIST, A. 2006. "Den är ju inte i fårhagen på studiebesök", Om lokala perspektiv och uppfattningar om varg och svensk rovdjurspolitik. Centrum för Forskning om Offentlig Sektor, Göteborgs universitet,.

SKOGEN, K., MAUZ, I. & KRANGE, O. 2008. Cry Wolf!: Narratives of Wolf Recovery in France and Norway. *Rural Sociology,* 71**,** 105-133.

SPRING, D., BAUM, J., NALLY, R. M., MACKENZIE, M., SANCHEZ-AZOFEIFA, A. & THOMSON, J. R. 2010. Building a Regionally Connected Reserv Network in a Changing and Uncertain World. *Conservation Biology,* 24**,** 691-700.

THE JAGUAR CONSERVATION FUND 2008. The Jaguar in Brazil. *In:* JACKSON, P. (ed.) *Cat News Special Issue.* London: UCN/SSC Cat Specialist Group ( IUCN - The World Conservation Union).

THE WORLD BANK 2011. Implementation completion and results report on a grant from the Global Environment Facility Trust Fund in the amount of US$4.0 million to the Central American Indigenous and Peasant Coordination Association for Community Agroforestry for an Integrated Ecosystem Management in Indigenous Communities Central America Regional Project. The World Bank.

WALKER, E. P. 1975. *Mammals of the world,* Baltimore, The John Hopkins University Press.

WEBLER, T., DANIELSON, S. & TULER, S. 2009. Using Q Method to Reveal Social Perspectives in Environmental Research. Greenfield, MA: Social and Environmental Research Institute.

WOODROFFE, R. & GINSBERG, J., R 1998. Edge Effects and the Extinction of Populations Inside Protected Areas. *Science,* 280**,** 2126-2128.

ZELLER, K. 2007. Jaguars in the New Millennium Data Set Update: The State of the Jaguar in 2006. A report prepared for the Wildlife Conservation Society's Jaguar Conservation Program.