



UNIVERSIDAD DE CHILE -FACULTAD DE CIENCIAS - ESCUELA
DE PREGRADO

“Aceptación social de diferentes técnicas de manejo de carnívoros a través de distintos
escenarios de conflicto entre la fauna silvestre y el humano”

Seminario de Título entregado a la Universidad de Chile en cumplimiento parcial de los
requisitos para optar al Título de Bióloga Ambiental

Marion Verónica Díaz Silva

Director del Seminario de Título: Javier A. Simonetti

Co-Director del Seminario de Título: Francisco Zorondo-Rodríguez

Octubre 2018

Santiago - Chile

ESCUELA DE PREGRADO – FACULTAD DE CIENCIAS – UNIVERSIDAD DE
CHILE



INFORME DE APROBACIÓN SEMINARIO DE TITULO

Se informa a la Escuela de Pregrado de la Facultad de Ciencias, de la Universidad de Chile que el Seminario de Título, presentado por la Srta. Marion Verónica Díaz Silva.

“Aceptación social de diferentes técnicas de manejo de carnívoros a través de distintos escenarios de conflicto entre la fauna silvestre y el humano”

Ha sido aprobado por la Comisión de Evaluación, en cumplimiento parcial de los requisitos para optar al Título de Bióloga con mención Medio Ambiente.

Director Seminario de Título:
Javier A. Simonetti

Co-Director Seminario de Título:
Francisco Zorondo-Rodríguez

Comisión revisora y evaluadora

Presidente Comisión
David Véliz

Evaluador
Rafael Asenjo

Santiago, octubre 2018

Para María Inés, Monito, Hildita, Maneco y Georgina

Biografía



Desde niña me han gustado los animales y las plantas, y siempre se me enseñó a respetarlos, cuidarlos y amarlos. Sin embargo, recién a los 14 años me enamoré de la biología y no pude dejarla. Llegué a la universidad desorientada, los primeros años fueron difíciles. Había tantos temas y laboratorios que me gustaban, era angustiante no poder decidir. En ecología conocí al profesor Simonetti y su laboratorio de Conservación Biológica, todo cambió. Llegué al laboratorio el año 2015 y una parte de mí quiere estar siempre ahí. Nadie es egoísta con el conocimiento y todos los días se aprende algo y se comparte. Eso quiero para mi vida. Dedicar mi energía y tiempo a hacer lo que más se pueda para conservar lo que amo y tener siempre las puertas abiertas para aprender temas nuevos, conocer especies, ecosistemas y culturas nuevas para mí y poder compartirlas.

Agradecimientos

Quiero agradecer a mis padres, por su apoyo y amor incondicional. Por siempre creer en mí y darme las herramientas necesarias para llegar hasta este punto. Por escucharme una y mil veces mis explicaciones de tesis y convencerme mediante sonrisas y asentimiento de que la entienden. Por aguantar mis rabietas ambientales. Y por darme la oportunidad de estudiar y aprender lo que amo. Gracias.

También a la Ani y la Nona, por ser las mejores amigas, asesoras y mamis. Por todo lo que me han enseñado, educado, apoyado y amado. Por escucharme siempre y consentirme en todo. Gracias por solucionarme los problemas reales e imaginarios. Por incentivar a soñar y otras veces a bajarme de las nubes y aterrizar mis ideas al mundo real. Por enseñarme a no rendirme y siempre ver otras posibilidades. Gracias.

A Joaquín, por ser mi compañero de sueños y aventuras. Gracias por todo el apoyo y amor. Por toda tu ayuda desde el primer momento. Contigo he crecido intelectual y emocionalmente. Gracias por estar siempre dispuesto a escuchar, opinar y aportar. Por tu enorme paciencia y por leer cada versión de esta tesis. Por entender y motivar mis ganas de hacer de este mundo, un mundo mejor. Gracias.

A mis tutores por todo lo que me enseñaron. Por entenderme y ayudarme a encontrar lo que me apasiona. Por darme el espacio y la libertad para conocer nuevas herramientas. Por la paciencia y el buen humor. Por apoyarme y motivarme a seguir en este lindo camino. Al Profesor Simonetti por aceptarme en el laboratorio y compartir día a día su conocimiento. Gracias por enseñarnos a ser mejores personas y buenos científicos.

A la Rocío, Pame, Diana, Ronny, Santiago, André y Ariel, de cada uno he aprendido mucho y estoy muy agradecida de sus comentarios y aportes en las presentaciones. A Diego, por su ayuda, apoyo y paciencia en terreno (y en Santiago). A la Caro U. (Caropedia) por enseñarme mucho de carnívoros y siempre apañar en todo. A la Caro S. por ayudarme en terreno. A Silvio por todas sus enseñanzas varias y paciencia. A la Ana por su apoyo, apañe y energías para terminar esta etapa. Gracias a todos por el apoyo y ayuda, son máximos.

A Gabriela y Gregor que me recibieron en la bella Estancia Anita Beatriz, son los mejores anfitriones y los más motivados. Tengo fe en que ganaran la batalla contra Mina Invierno. Les agradezco toda su dedicación a la conservación de la Isla. Prometo volver y completar mi check list de aves. Gracias a la Asociación Kauyeken por el financiamiento y las oportunidades de participación en actividades e investigaciones.

A toda mi familia, en especial mis primas, Paola y Viviana. Gracias por siempre apoyarme. Por creer en mí y motivarme a hacer lo que me gusta. A mis primos, por siempre darme el cariño de hermanos. A mis amigas del colegio, por su apoyo y amor constantes. A la Sofi, Juan, Joaqui, Pancho, Paula, Raúl, Jaime, Ítalo, Cata, Esteban, Fran, Mango, Nai, Barbara y Felipe, gracias por hacer la vida universitaria un muy lindo recuerdo, son los mejores.

Finalmente, gracias a la gente en Magallanes que participó en la encuesta, a la Asociación de Ganaderos de Magallanes. A todos los que me ofrecieron comida, té y chocolates mientras los encuestaba. Al Programa de apoyo a la investigación, Facultad de Ciencias, Universidad de Chile (PAIFAC). Al Comité Ético de la Facultad de Ciencias y el Comité de Ética de la Facultad de Filosofía y Humanidades de la Universidad de Chile que certificaron mi encuesta y el consentimiento informado.

ÍNDICE

| | |
|--|-------------|
| BIOGRAFÍA | IV |
| AGRADECIMIENTOS | V |
| LISTA FIGURAS | VIII |
| RESUMEN | 1 |
| ABSTRACT | 2 |
| INTRODUCTION | 3 |
| METHODS | 7 |
| DATA COLLECTION STRATEGY | 7 |
| VARIABLES | 8 |
| ANALYSIS OF DATA | 9 |
| RESULTS | 12 |
| SOCIAL ACCEPTABILITY AND CONSENSUS OF NO ACTION APPROACH | 12 |
| SOCIAL ACCEPTABILITY AND CONSENSUS OF FRIGHTEN APPROACH | 144 |
| SOCIAL ACCEPTABILITY AND CONSENSUS OF RELOCATE APPROACH | 166 |
| SOCIAL ACCEPTABILITY AND CONSENSUS OF LETHAL CONTROL APPROACH | 19 |
| DISCUSSION | 22 |
| REFERENCES | 25 |
| ANNEX 1 | 30 |

Lista figuras

| | |
|--|----|
| Figure 1. Study area | 8 |
| Figure 2. a. Acceptability of “No Action” approach. | |
| b. Magnitude of the PCI ₂ of “No Action” approach. | 13 |
| Figure 3. a. Acceptability of “Frighten” approach. | |
| b. Magnitude of the PCI ₂ of “Frighten” approach. | 15 |
| Figure 4. a. Acceptability of “Relocate” approach. | |
| b. Magnitude of the PCI ₂ of “Relocate” approach. | 17 |
| Figure 5. a. Acceptability of “Lethal Control” approach. | |
| b. Magnitude of the PCI ₂ of “No Action”. | 21 |

Resumen

La aceptación social determina la efectividad de la gestión de carnívoros silvestres para disminuir el conflicto entre ganaderos y carnívoros nativos. El manejo del conflicto es clave para evitar las pérdidas económicas en la producción ganadera y las amenazas hacia la biodiversidad. Técnicas de manejo del conflicto incluyen uso de repelentes, la relocalización de carnívoros conflictivos y empleo de veneno y cacería. Su aceptabilidad puede variar entre diferentes actores sociales (ganaderos y sociedad civil), escenarios de conflicto (ver al animal caminando en zona rural o ver al animal atacando al ganado o a una persona) y carnívoros involucrados (nativos y perros asilvestrados). Evaluamos la aceptación social y el grado de consenso asociado al uso de estas técnicas sobre carnívoros nativos y perros asilvestrados en Magallanes, usando el Índice de potencial conflicto (PCI₂). El estudio muestra que, en escenarios más peligrosos (desde la perspectiva humana), es socialmente más aceptable asustar o relocalizar a carnívoros silvestres y es inaceptable no llevar a cabo ninguna acción. En relación con los perros asilvestrados, los ganaderos tienen una opinión diferente a la sociedad civil. Sin embargo, no hay diferencia entre ganaderos y sociedad civil cuando se trata de carnívoros nativos. Finalmente, ganaderos aceptan con más frecuencia el control letal de perros asilvestrados que de carnívoros nativos. El estudio sugiere las oportunidades de aceptación que tendrían las técnicas de manejo, evidenciando empíricamente cuál grupo social, escenarios, y tipo de carnívoro determinan la disposición a aceptar de las personas.

Abstract

Social acceptability determines the effectiveness of the management of wild carnivores to reduce the conflict between ranchers and native carnivores. Conflict management is key to avoiding economic losses in livestock production and threats to Biodiversity. Conflict management techniques include the use of repellents, relocation of conflicting carnivores, and the use of poison and hunting. Its acceptability can vary between different social actors (livestock producers and civil society), conflict scenarios (like seeing the animal attacking livestock or a person) and involved carnivores (natives or feral dogs). We evaluated the social acceptability and the degree of consensus associated with the use of these techniques on native carnivores and feral dogs in Magallanes, using the potential conflict index (PCI₂). The study shows that, in more dangerous scenarios (from a human perspective), it is socially more acceptable to frighten or relocate wild carnivores and unacceptable not to carry out action at all. Ranchers have a different opinion than non-ranchers when it comes to feral dogs. However, there is no difference between these interested parties when it comes to native carnivores. Finally, Ranchers accept lethal control more often when feral dogs rather than native carnivores are involved. The study indicates the opportunities of acceptance that the management techniques would have, empirically evidencing which social group, scenarios, and type of carnivore determine the disposition to accept management actions by society.

Introduction

Conflicts between humans and wildlife should be managed to minimize negative impact upon biodiversity (Redpath et al., 2013). Devising successful management plans for avoiding or minimizing human-wildlife conflicts requires not only the evaluation of biological factors, but also needs to consider the underlying cultural variability of the society involved and the social acceptability of the management actions that would be used to minimize the impacts of the conflict (Sillero-Zubiri and Laurenson, 2001; Altrichter et al., 2006; Marchini, 2014; Sakurai and Jacobson, 2011; Manfredo and Dayer, 2004). Minimizing human-wildlife conflicts allows us to move forward the efforts to conserve biological diversity outside protected areas as has been proposed in the seventh goal on the Strategic Plan for Biodiversity 2010-2020 of the Convention on Biological Diversity (CBD, 2010).

Conflict regarding biodiversity occurs when two or more parties have different opinions regarding the species involved (Redpath et al., 2013). An explicit and long-standing case is the conflict between ranchers and people focused on the conservation of wild carnivores. Predation upon livestock have a negative impact on the production of cattle, the survival of native species, and cause economic losses triggering the conflict (Barua et al., 2013; Liordos et al., 2016).

The resolution or mitigation of the impact generated by carnivores preying upon livestock is tackled relying on the use different management actions. These can be lethal or non-lethal and may vary in the effectiveness and/or present unwanted side effects.

The most frequent non-lethal management actions are the use of deterrents and repellents, and relocation (Linnell et al., 1996). Deterrents and repellents can be chemical, visual or acoustic (Linnell et al., 1996) and have proven to be effective in decreasing livestock predation (Eeden et al., 2018). Although relocation is considered a non-lethal management action, the survival of relocated individuals can be compromised by various factors such as homing and the risk associated, and the abundance of wild prey at the site of release (Fontúrbel and Simonetti, 2011). The most common lethal management actions are poisoning and hunting (Linnell et al., 1996), both being socially rejected by some social actors, as people not linked to livestock production (Travaini et al., 2000; Montecino-Latorre and San Martín, 2018). The indiscriminate use of poison is a danger not only for problem species but also to other wild species. Hunting can be selective, by removing only the “problem individuals” (Linnell et al., 1999; Schwartz et al., 2003), but recent studies show that efficacy of this technique to reduce predation of livestock is low (Moreira-Arce et al., 2018). Poisoning and hunting represent a threat to the conservation of biodiversity as it negatively impinges upon survival of wild predator (Travaini et al., 2000; Schwartz et al., 2003).

Each management actions can have a different level of social acceptability, that is, a different “judgment or decision regarding the appropriateness of a particular action or policy” (Bruskotter et al., 2009: 121). Therefore, the use of a given method can convey different degrees of consensus among social groups as “The acceptability of a proposed management action is a function of one’s evaluation of that action, as

compared with perceived alternatives, including no action at all” (Bruskotter et al., 2009: 120).

The social acceptability of different management actions depends on factors such as: i) the type of encounter scenario between the person and the wild carnivore involved (Liordos et al., 2016), ii) species’ provenance (whether they are native or exotic carnivores), and public perception (Veitch and Clout, 2001; Liordos et al., 2016; Bremmer and Park, 2007; Olszańska et al., 2016), and iii) the different social actors (Liordos et al., 2016). First, from the human perspective, the different scenarios of encounters range from less serious, for example, seeing the animal walking, to more severe, like seeing the animal attacking a person (Liordos et al., 2016; Manfredo, 1998; Heneghan, 2016). Some actions, like lethal control would be more acceptable in dangerous scenarios than those implying lesser risks to people or livestock (Liordos et al., 2016). Second, species’ provenance, be it native or exotic, and the public perception of them, can be “hated invasive” or “attractive invasive” (Veitch and Clout, 2001; Liordos et al., 2016; Bremmer and Park, 2007; Olszańska et al., 2016), or people can ignore that a species is native or exotic. Regarding exotic species, lethal actions are more accepted in comparison with its use upon native ones if the exotic species is considered “hated invasive” (Liordos, 2016). Third, the level of social acceptability of management actions for wild carnivores varies between different social actors (Liordos et al., 2016), actors who are affected by the conflict are more likely to accept lethal techniques (Fraser, 2006; Schwartz et al., 2003). Therefore, unraveling conditions to accept a given

managerial approach to deal with wildlife engaged in conflicts is paramount to elaborate socially supported programs.

This research aims to determine in different social groups (we considered ranchers and non-ranchers) the social acceptability and the degree of consensus associated to different management actions under different encounter scenarios for native and introduced carnivores. This allows us to bring key information for making decision process in order to reduce the conflict in a successful way. The process of decision making must be based empirical evidence of the beliefs of the people before, during and after the implementation of measures related to wildlife management (Bath, 1998), this is particularly sensitive issues for large carnivores since human activity is the main source of its decline (Woodrofe, 2000). We evaluated the cases of puma (*Puma concolor*), culpeo fox (*Lycalopex culpaeus*) and grey fox (*Lycalopex griseus*), as native species, and feral dogs (*Canis familiaris*) as the case of exotic species. In Chile, pumas and foxes are considered “problematic species” by ranchers and peasants (Galvez et al., 2018; Silva-Rodríguez et al., 2009; Zorondo-Rodríguez et al., 2014), because they prey upon livestock and domestic animals. As consequence, these species are frequently persecuted and illegally hunted by ranchers (Franklin et al., 1999; Silva-Rodríguez et al., 2009). In fact, ongoing research estimate that at least 114 foxes and 60 pumas were hunted in Punta Arenas, San Gregorio, Puerto Natales, Torres del Paine, Río Verde and Laguna Blanca all communes of the Region of Magallanes and Chilean Antarctica between July 2016 and July 2017, as a result of the predation perceived by ranchers (D.

Peñaranda, unpublished). Also, feral dogs have been recognized as the main predator upon sheep countrywide (Montecino-Latorre and San Martín, 2018).

Methods

The study was carried out in the Region of Magallanes and Chilean Antarctica (Fig. 1). In this region, the livestock activity began around a century ago (Soto, 2001). Magallanes accounts for the 77% of the national sheep production and concentrates a mass close to 1.6 million heads of sheep (INE, 2017). This mass has decreased by 28.8% in ten years, in 2007 there were 2.2 million heads of cattle (INE, 2007). Of the annual losses, 42% are due to predation by wild carnivores (INE, 2017), which translates to approx. \$2.463.930 dollars per year (Montecino-Latorre and San Martín, 2018).

Data collection strategy

The total number of people considered in the sample were 92 adults, from Punta Arenas, Puerto Natales, Torres del Paine, Río Verde and Laguna Blanca. Data collecting took place during May and August of the year 2017.

We carried out a systematic protocol of data collection, we selected the houses at randomly in Punta Arenas and Puerto Natales. To proceed with the interview, we requested for an adult (+18 years old). In Río Verde people who work in the municipality and who volunteered to participate in the study were interviewed. In Isla Riesco (Río Verde), Torres del Paine and Laguna Blanca, cattle ranchers were visited, and owners and/or workers were interviewed. All participants were read an informed consent they signed to confirm their participation in this study.

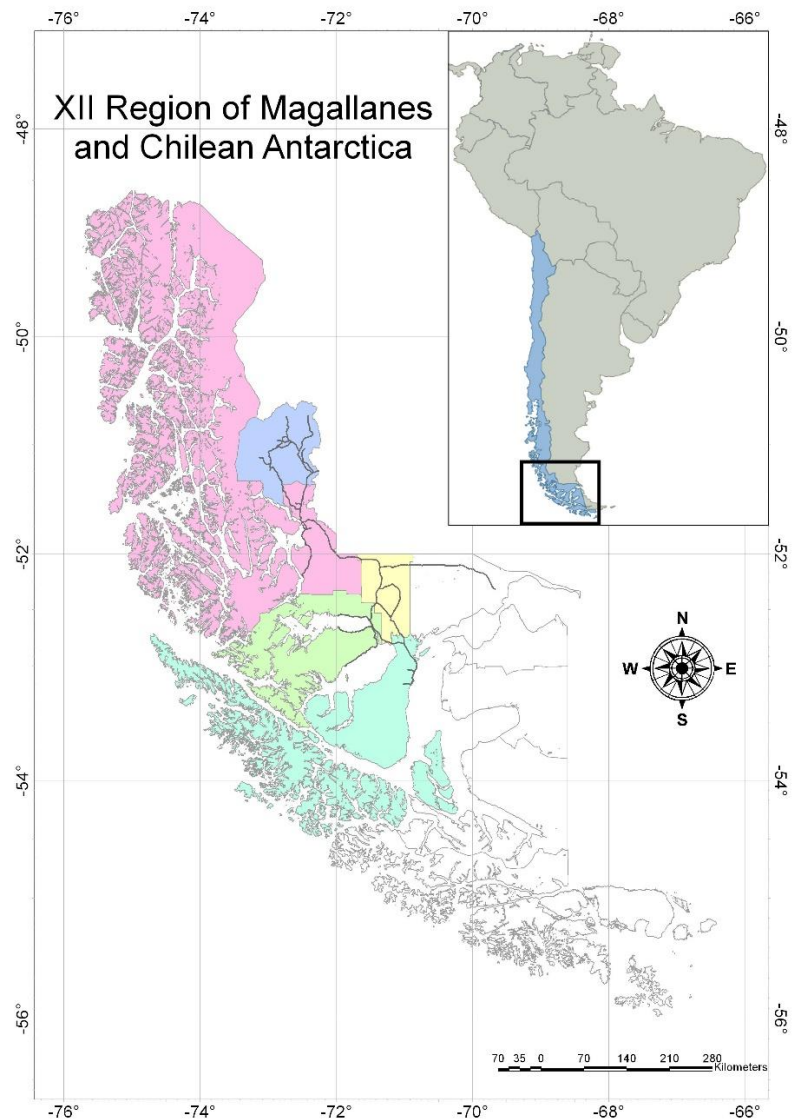


Figure 1. Study area. Visited communes in colored. Puerto Natales in pink, Torres del Paine in blue, Río Verde in green, Laguna Blanca in yellow and Punta Arenas in light blue. The line is the route followed.

Variables

We carried out a structured questionnaire to capture the information about I) sociodemographic attributes, II) social acceptability and III) degree of consensus of different management actions. The structured questionnaires included two sections. The first section included a set of questions to gather sociodemographic information that

allowed us to characterize the sample and determine to which social group each participant belonged (rancher or non-rancher). Every participant who worked in any area of livestock production was considered a rancher. The second section evaluated the acceptability for each management action: no action, frighten, relocate and lethal control, under different encounter scenarios for puma (*Puma concolor*), culpeo fox (*Lycalopex culpaeus*), grey fox (*Lycalopex griseus*) and feral dogs (*Canis familiaris*) separately. We evaluated five encounter scenarios that vary in severity from the human perspective. These were (from the less to more severe): i) seeing the animal walking in a rural area, ii) attacking native fauna, iii) walking in the city, iv) attacking sheep, and v) attacking a person. To assess the social acceptability of each action, we used a 5-points Likert scale ranged from -2 (Strongly Disagree) to 2 (Strongly Agree). As a proxy for acceptability, each participant was asked how much they agree or disagree with each management action under each scenario for the different species (Annex 1).

Analysis of data

In order to estimate the degree of consensus associated to social acceptability for each management actions, we used the inverse of Potential Conflict Index (PCI_2) (Manfredo et al., 2003; Vaske et al., 2006; Vaske et al., 2010). Inverse PCI_2 can take values between 0 and 1, where 0 indicates that there is no consensus in the social group (ranchers or non-ranchers) and the answers were equally divided between the values of the extremes in the response Likert scale (-2 and 2), so there is greater potential for conflict. A value of 1 indicates that there is a consensus in the social group and all

answers grouped in whatever option, so there is no potential conflict. The calculation of this index for an i -value Likert scale is done with the following equation:

$$\text{Inverse of } PCI_2 = 1 - \left[\sum \frac{n_k n_h d_{k,h}}{\delta} \right]$$

for $k = 1$ to i , $h = 1$ to i , and where n_k =number of respondents at each scale value, n_h =number of respondents at other scale values, $d_{k,h}$ =distances between respondents, and δ =maximum distance between extreme values multiplied by the number of time this distance occurs (Vaske et al., 2010).

This index also allows a statistical analysis between different stakeholders (ranchers and non-rancher people), calculating a value d , where values higher than 1.96 indicate that the difference between stakeholders is statistically significant ($p < 0.05$) (Vaske et al., 2010), estimated as:

$$d = \frac{ABS(PCI_a - PCI_b)}{\sqrt{(PCI_{aSD})^2 + (PCI_{bSD})^2}}$$

where ABS = absolute value, PCI_a = observed PCI_2 for the first group, PCI_b = observed PCI_2 for the second group, PCI_{aSD} = standard deviation of the simulated PCI_2 distribution for the first group, PCI_{bSD} = standard deviation of the simulated PCI_2 distribution for the second group.

PCI_2 is based on distance functions and do not rely on traditional standard deviations, (J. Vaske, personal communication). “The rating of person (x) relative to that of person (y) can be thought of as a function of the distance between their responses

$d_{x,y} = f(r_x, r_y)$ ” (Vaske et al., 2010: 6). Two people with responses of -2 and -1 are not necessarily in conflict. Also, people with positive or negative responses may perceive no conflict with a person with a neutral response. We use a “neutral” responses in the calculation of distance, defined as:

$$D_2 = d_{x,y} = |r_x - r_y| \text{ if } \text{sign}(r_x) \neq \text{sign}(r_y), \text{ otherwise } d_{x,y} = 0$$

where D_2 = distance function that includes “neutral” responses, $d_{x,y}$ = distance between people on a variable, r_x, r_y = response x and response y , respectively, and sign = the sign for a positive or negative number (+ or -) (Vaske et al., 2010).

The distance scores can be raised to some power so that gives more weight to larger differences between individuals (Vaske et al., 2010), we used a power of 2. The general PCI_2 distance expression for distances with a power is:

$$Dp_{x,y} = d_{x,y} = \left(|r_x - r_y| - (m - 1) \right)^p \text{ if } \text{sign}(r_x) \neq \text{sign}(r_y) \text{ for } p > 0, \text{ otherwise}$$

$$d_{x,y} = 0$$

where $Dp_{x,y}$ = distance raised to some power, $m = D_2$ and p = power (Vaske et al., 2010).

Results

Social acceptability and consensus of No Action approach

Social acceptability towards the “No Action” approach decreased as the severity of the scenarios increased, regardless of the carnivore involved. Both groups agree that some action could be taken when a wild carnivore attack a person (Fig. 2a).

Ranchers disagree with the “No Action” alternative under all scenarios when dealing with feral dogs. On the contrary, when dealing with native carnivores, they agree with the “No Action” approach under either, seeing the animal walking in a rural area or attacking native fauna. But, ranchers disagree with the "No Action" approach under two scenarios, seeing the animal attacking sheep and attacking a person when dealing with native carnivores (Fig.2a).

In turn, non-ranchers showed a neutral attitude towards the “No Action” approach, for feral dogs under either, seeing the animal walking in a rural area or attacking native fauna. On the contrary, when dealing with native carnivores, they agree with the “No Action” approach under either walking in a rural area or attacking native fauna (Fig. 2a).

For all wild carnivores, the consensus among ranchers and non-ranchers increased as the severity of the scenario augmented (Fig. 2b). Ranchers showed greater consensus for feral dogs than for native carnivores ($d = 2.34$) in the scenario of seeing the animal walking in a rural area.

No Action

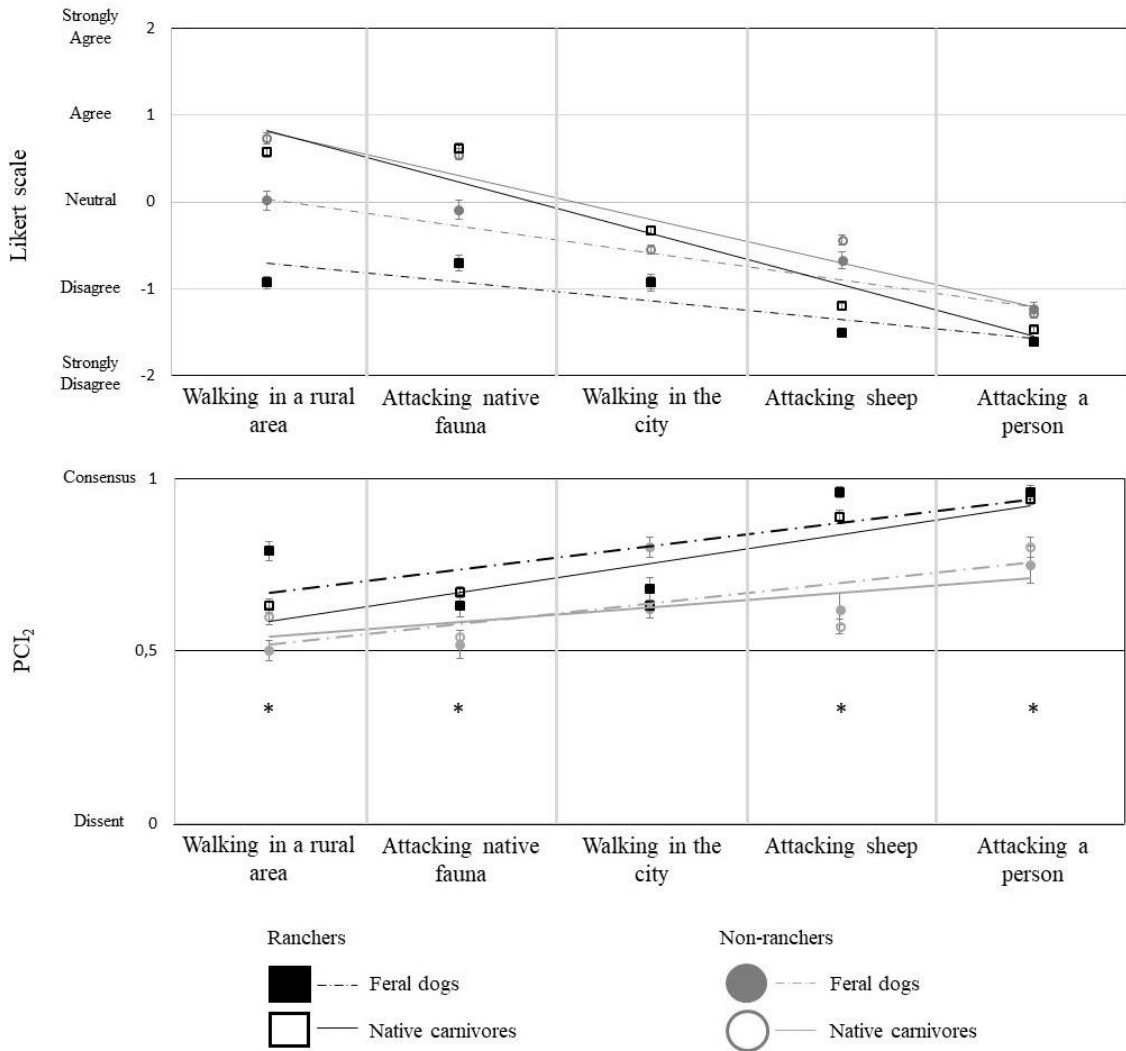


Figure 2. a. Acceptability of “No Action” approach in each scenario for feral dogs and native carnivores. The y-axis corresponds to the Likert scale, whereas the x-axis to the different encounter scenarios. Dots and squares represent the mean response of the Likert scale to “No Action” by ranchers and non-ranchers. **b.** Magnitude of the PCI₂ of “No Action” approach in each scenario and for feral dogs and native carnivores. The y-axis corresponds to the grade of consensus or dissent according to the magnitude of the inverse PCI₂. Where 0 indicates that there is a dissent and a value of 1 indicate that there is a consensus. The x-axis corresponds to the different encounter scenarios. (*) Indicates that a significant difference ($d > 1.96$).

Concerning native carnivores, ranchers presented greater consensus in comparison to non-ranchers under three scenarios: attacking native fauna ($d = 2.46$), attacking sheep ($d = 5.58$) and attacking a person ($d = 2.17$). In relation to feral dogs, ranchers presented greater consensus in comparison to non-ranchers under two scenarios: walking in a rural area ($d = 3.60$) and attacking sheep ($d = 3.49$) (Fig. 2b).

Social acceptability and consensus of Frighten approach

A pattern emerges wherein social acceptability of the “Frighten” approach seems positively related to the severity of the scenarios, regardless of the carnivore involved. When ranchers deal with feral dogs, they have neutral attitudes towards “Frighten” approach in either attacking native fauna or walking in the city but, they agree with the “Frighten” approach in three scenarios: walking in a rural area, attacking sheep or attacking people (Fig. 3a).

When ranchers deal with native carnivores, they showed neutral attitudes towards the “Frighten” approach in either walking in a rural area or walking in the city. Also, they disagree with the “Frighten” approach in the scenario of seeing the animal attacking native fauna, but they agree with the “Frighten” approach in either attacking sheep or attacking a person (Fig. 3a).

When non-ranchers deal with feral dogs, they have neutral attitudes concerning the “Frighten” approach in either walking in a rural area or attacking native fauna. When non-ranchers deal with native carnivores, they disagree with the “Frighten” approach in

either walking in a rural area or attacking native fauna, but they agree with the “Frighten” in either attacking sheep or attacking a person (Fig. 3a).

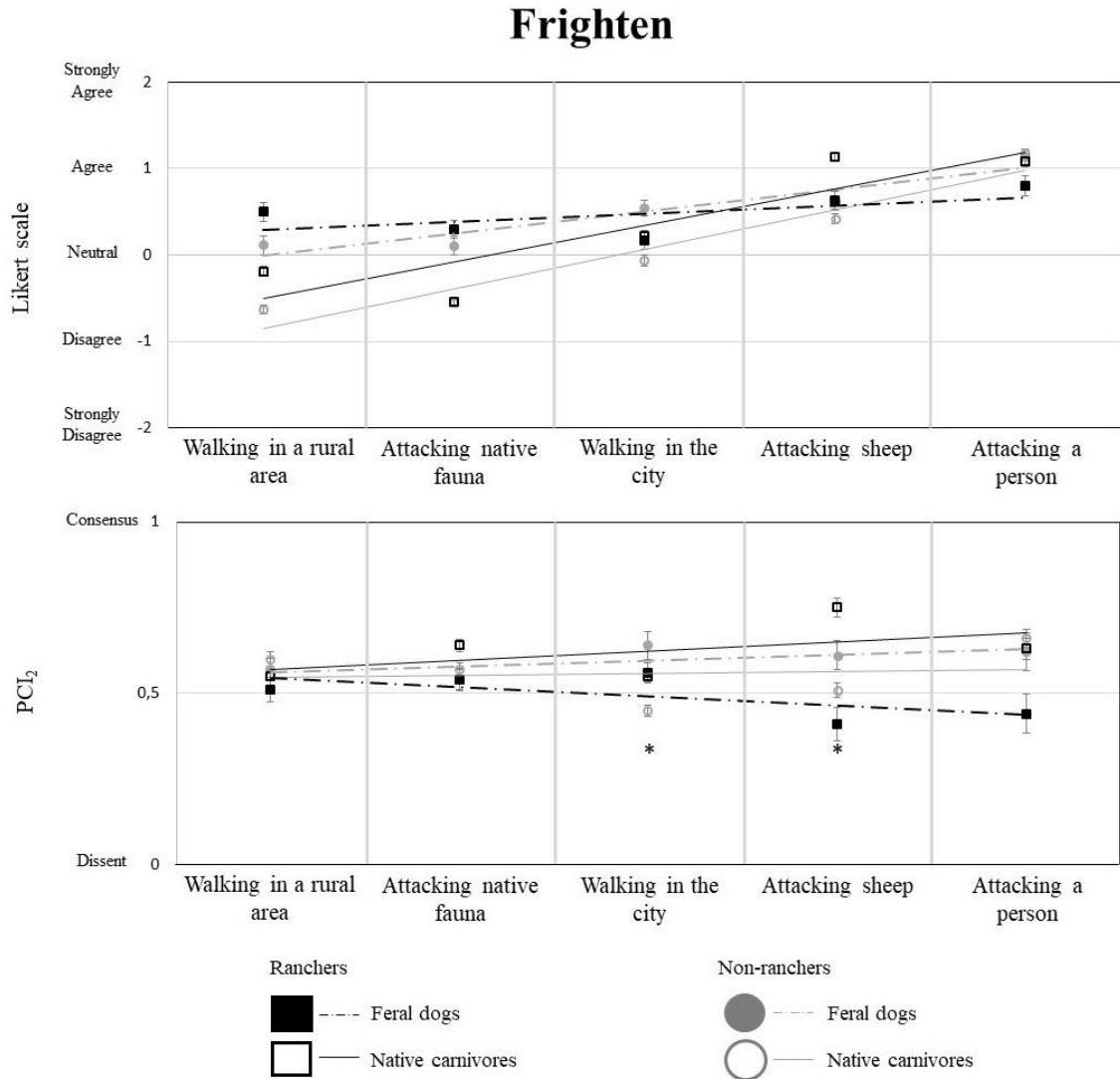


Figure 3. a. Acceptability of the “Frighten” approach in each scenario for feral dogs and native carnivores. The y-axis corresponds to the Likert scale, whereas the x-axis to the different encounter scenarios. Dots and squares represent the mean response of the Likert scale to “Frighten” by ranchers and non-ranchers. **b.** Magnitude of the PCI₂ of “Frighten” approach in each scenario and for feral dogs and native carnivores. The y-axis corresponds to the grade of consensus or dissent according to the magnitude of the inverse PCI₂. Where 0 indicates that there is a dissent and a value of 1 indicate that there is a consensus. The x-axis corresponds to the different encounter scenarios. (*) Indicates that a significant difference ($d > 1.96$).

The dissent among ranchers augmented as the severity of the scenario increased when concerning feral dogs. On the contrary, when involves native carnivores, the consensus among ranchers augmented as the severity of the scenario increased. Ranchers showed greater consensus for native carnivores than for feral dogs ($d = 3.05$) in the scenario see the animal attacking sheep. Non-ranchers showed greater consensus for feral dogs than for native carnivores ($d = 2.20$) in the scenario see the animal walking in the city. Concerning native carnivores, ranchers presented greater consensus in comparison to non-ranchers in either walking in the city ($d = 2.18$) and attacking sheep ($d = 3.55$) (Fig. 3b).

Social acceptability and consensus of Relocate approach

Social acceptability of the “Relocate” approach seems positively related to the severity of the scenarios. When ranchers deal with feral dogs, they have neutral attitudes concerning the “Relocate” approach in all scenarios. When ranchers deal with native carnivores, they showed neutral attitudes with the “Relocate” approach in either walking in a rural area or attacking native fauna. But, when ranchers deal with native carnivores, they agree with the “Relocate” approach in three scenarios: walking in the city, attacking sheep or attacking people (Fig. 4a).

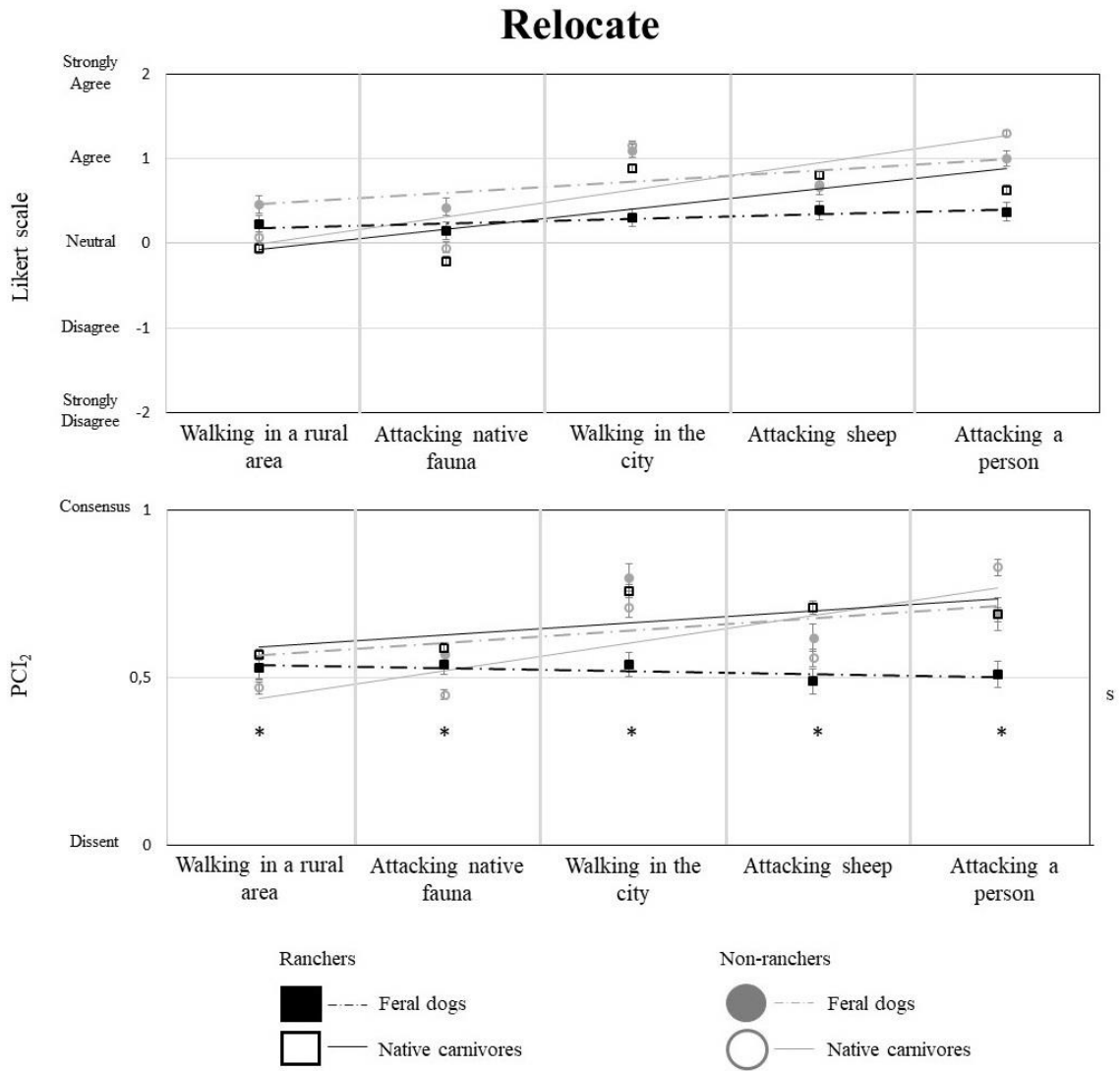


Figure 4. a. Acceptability of the “Relocate” approach in each scenario for feral dogs and native carnivores. The y-axis corresponds to the Likert scale, whereas the x-axis to the different encounter scenarios. Dots and squares represent the mean response of the Likert scale to “Relocate” by ranchers and non-ranchers. **b.** Magnitude of the PCI₂ of “Relocate” approach in each scenario and for feral dogs and native carnivores. The y-axis corresponds to the grade of consensus or dissent according to the magnitude of the inverse PCI₂. Where 0 indicates that there is a dissent and a value of 1 indicate that there is a consensus. The x-axis corresponds to the different encounter scenarios. (*) Indicates that a significant difference ($d > 1.96$).

When non-ranchers deal with native carnivores, they showed neutral attitudes towards the “Relocate” approach in either walking in a rural area or attacking native fauna. When non-ranchers deal with feral dogs, they have neutral values with the “Relocate” approach in either walking in a rural area or attacking native fauna. Also, when non-ranchers deal with feral dogs, they agree with the “Relocate” approach under three scenarios: walking in the city, attacking sheep or attacking a person (Fig. 4a).

The consensus among non-ranchers augmented as the severity of the scenario increased regarding all wild carnivores. The consensus among ranchers augmented as the severity of the scenario increased when concerning native carnivores. Ranchers showed greater consensus for native carnivores than for feral dogs under three scenarios: walking in the city ($d = 2.66$), attacking sheep ($d = 2.52$) and attacking a person ($d = 2.02$) (Fig.4b).

Concerning native carnivores, ranchers presented greater consensus in comparison to non-ranchers under three scenarios: walking in a rural area ($d = 2.08$), attacking native fauna ($d = 3.14$) and attacking sheep ($d = 2.32$). On the contrary, non-ranchers presented greater consensus in comparison to ranchers in the scenario see the animal attacking a person ($d = 2.12$). Concerning feral dogs, non-ranchers presented greater consensus in comparison to ranchers in the scenario see the animal walking in the city ($d = 2.43$) (Fig. 4b).

Social acceptability and consensus of Lethal Control approach

Social acceptability of the “Lethal Control” approach seems positively related to the severity of the scenarios. Social acceptability towards relying on lethal control increased as the severity of the scenarios increased. Ranchers agreed with its use dealing with feral dogs under all scenarios. On the contrary, non-ranchers disagree with lethal control except when feral dogs attack a person (Fig. 5a).

When ranchers deal with native carnivores, they disagree with the “Lethal Control” approach under three scenarios: walking in a rural area, attacking native fauna or walking in the city. Also, when ranchers deal with native carnivores, they have neutral values with the "Lethal Control" approach in either attacking sheep or attacking a person. When non-ranchers deal with native carnivores, they disagree with the “Lethal Control” approach under all scenarios (Fig. 5a).

The consensus among ranchers augmented as the severity of the scenario increased when concerning feral dog. On contrary, when considering native carnivores, the dissent among ranchers augmented as the severity of the scenario increased. Ranchers showed greater consensus for native carnivores than for feral dogs either attacking native fauna ($d = 3.38$) or walking in the city ($d = 2.84$). On the contrary, ranchers presented greater consensus for feral dogs than for native carnivores in the scenario see the animal attacking a person ($d = 2.51$) (Fig. 5b).

The consensus among non-ranchers decreased as the severity of the scenario augmented regarding all wild carnivores. Non-ranchers showed greater consensus for

native carnivores than for feral dogs in either attacking native fauna ($d = 3.33$) or walking in the city ($d = 2.87$) (Fig. 5b).

Concerning native carnivores, non-rancher showed greater consensus in comparison to ranchers when seeing the animal attacking sheep ($d = 2.50$). In relation to feral dogs, ranchers presented greater consensus in comparison to non-ranchers in the scenario when an animal is attacking a person ($d = 3.01$) (Fig. 5b).

Finally, under the scenario see the animal attacking sheep, for ranchers, the most accepted management action was the “Frighten” approach when it comes to native species ($PCI_2 = 0.75$). Also, when it comes to feral dogs, the most accepted approach was “Lethal Control” ($PCI_2 = 0.61$), so there was a consensus in both opinion. For non-ranchers, the most accepted management action was the “Relocate” option when it comes to all wild carnivores, for the native species $PCI_2 = 0.56$ and for feral dogs $PCI_2 = 0.62$.

Lethal Control

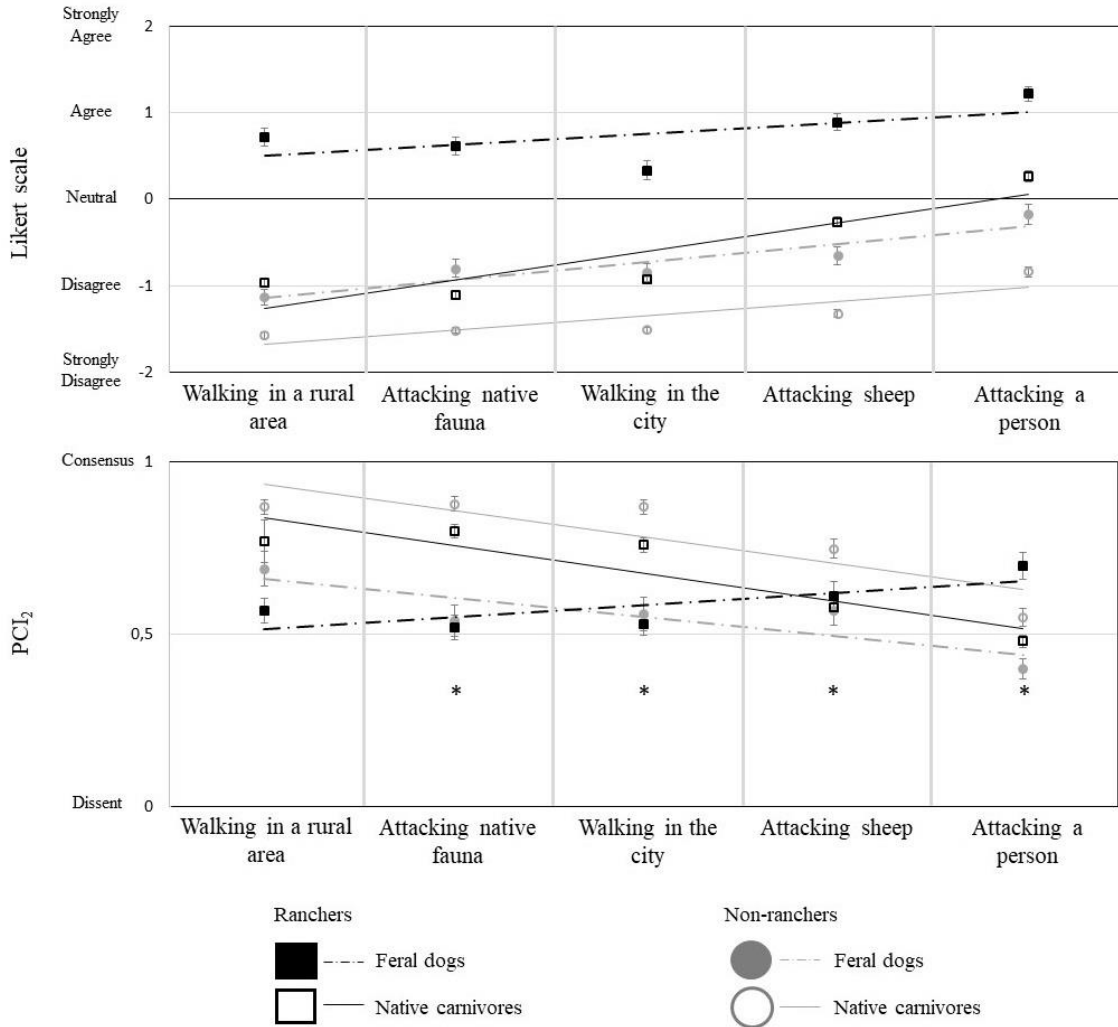


Figure 5. a. Acceptability of “Lethal Control” approach in each scenario for feral dogs and native carnivores. The y-axis corresponds to the Likert scale, whereas the x-axis to the different encounter scenarios. Dots and squares represent the mean response of the Likert scale to “Lethal Control” by ranchers and non-ranchers. **b.** Magnitude of the PCI₂ of “Lethal Control” approach in each scenario and for feral dogs and native carnivores. The y-axis corresponds to the grade of consensus or dissent according to the magnitude of the inverse PCI₂. Where 0 indicates that there is a dissent and a value of 1 indicate that there is a consensus. The x-axis corresponds to the different encounter scenarios. (*) Indicates that a significant difference ($d > 1.96$).

Discussion

Social acceptability towards wildlife management actions varies according to a set of contextual and social factors (Liordos et al. 2016; Bruskotter, Vaske and Schmidt 2009). We found that 1) in more dangerous scenarios (from a human perspective), it is socially more acceptable to frighten or relocate wild carnivores and unacceptable not to carry out action at all. 2) Ranchers have a different opinion than non-ranchers when it comes to feral dogs. However, there is no difference between these interested parties when it comes to native carnivores. 3) Ranchers accept lethal control more often when feral dogs rather than native carnivores are involved. Hence, successful conservation of wild carnivores will depend on the use of socially acceptable management actions, which must be situation-specific and driven by empirical data (Treves & Karanth, 2003). The information about context where these conflicts occur, and participants involved may aid in the prediction, prevention, and mitigation of conflict and is essential to the decision-making process (Treves & Karanth, 2003, Redpath et al., 2013).

Social acceptability of management actions varies according to the type of encounter scenario with wild carnivores (Wittmann et al., 1998; Zinn et al., 1998; Don Carlos et al., 2009; Liordos et al., 2016). Taking no action is unacceptable in more severe situations, such as when a person's life was in danger, while social acceptability of the lethal control is higher as the severity increased. In fact, there is a higher level of support for more severe management actions (lethal control, relocation) in scenarios involving higher severity (human and animal in danger) than in situations of lower severity (see also Liordos et al. 2016). Relocation was socially accepted as a

management action when a wild carnivore attack sheep or a person, probably because it is considered a non-lethal action, although the survival of translocated individuals is low and might be equivalent to lethal control. Only 46% of translocated pumas for instance, lived at least one year after being moved (Fontúrbel and Simonetti, 2011; Treves and Karanth, 2003). Differences in social acceptability of management actions across different scenarios of human-wildlife encounters must therefore be explicitly be considered in the process of decision making.

Judgments on acceptability are influenced by their social setting and are partially based on the perceived judgment of reference groups (Brunson, 1993, 1996). The observed difference between a suite of social groups might occur because wild carnivores are closely related to the productive activity of the ranchers and have impact on their wellbeing, threatening their livelihood and cultural identity (Díaz et al., 2015). Therefore, ranchers react to this threat, be it real or perceived risk (Conforti and De Azevedo, 2003). Occupation then is a strong predictor of social acceptability of a given management technique (Liordos et al., 2016). Ranchers accepted lethal control of feral dogs more than non-ranchers suggesting that ranchers are aware that feral dogs cause direct damage to their productive activity. However, they are also an heterogenous group attested by the low consensus when relying on just frightening feral dogs in the scenario of feral dogs attacking a person. Probably this heterogeneity is based on their previous experience to feral dogs attacks or acquaintance this phenomenon (Amit and Jacobson, 2017). In general, ranchers tend to differentiate more between feral dogs and native carnivores in comparison to non-ranchers. Ranchers accepted lethal control of feral dogs

more than of native carnivores. This suggests that ranchers perceive feral dogs as a “hated invasive” whereas non-rancher perceive them as an “attractive invasive”. Exotic species control is usually troubled as the public is more supportive of the eradication of a “hated invasive” than an “attractive invasive” (Bremner and Park, 2007; Veitch and Clout, 2001). Different postures toward feral dogs in the same encounter scenario generate problems in the social support to management efforts. This may explain why in Chile a decree that allowed lethal control of dogs outside urban areas failed to be implemented (Montecino-Latorre and San Martín, 2018).

Public policy ought to be socially supported. Actions to be carried out to ensure livestock raising is environmentally sustainable require to reduce conflicts with carnivores. The varied degrees of social acceptability and consensus regarding wildlife management actions by different segments of the society, under diverse encounter scenarios, for different wild carnivores pinpoint that such diversity ought to be considered in advance when preparing a campaign to deal with this issue in order to minimize social conflicts when addressing either the control of feral dogs and the conservation of native carnivores.

References

- Altrichter, M., Boaglio, G., Perovic, P., 2006. The decline of jaguars *Panthera onca* in the Argentine Chaco. *Oryx*. 40, 302-309.
- Amit, R., Jacobson, S. K., 2017. Understanding rancher coexistence with jaguars and pumas: a typology for conservation practice. *Biodiversity and Conservation*. 26, 1353-1374.
- Barua, M., Bhagwat, S. A., Jadhav, S., 2013. The hidden dimensions of human–wildlife conflict: health impacts, opportunity and transaction costs. *Biological Conservation*. 157, 309-316.
- Bath, A.J., 1998. The role of human dimensions in wildlife resource research in wildlife management. *Ursus*. 10, 349-355.
- Bremner, A., Park, K., 2007. Public attitudes to the management of invasive non-native species in Scotland. *Biological Conservation*. 139, 306-314.
- Brunson, M. W., 1993. “Socially acceptable” forestry: What does it imply for ecosystem management. *Western Journal of Applied Forestry*. 8, 116-119.
- Brunson, M. (1996). A definition of “social acceptability” in ecosystem management. Paper presented at the Defining Social Acceptability in Ecosystem Management: A Workshop Proceedings, General Technical Report PNW-GTR-369. United States Department of Agriculture, Forest Service, Portland, OR.
- Bruskotter, J.T., Vaske, J.J., Schmidt, R.H., 2009. Social and cognitive correlates of Utah residents' acceptance of the lethal control of wolves. *Human Dimensions of Wildlife*. 14, 119-132.
- CDB, 2010. Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets “Living in Harmony with Nature”. Convention on Biological Diversity. Available at: <https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-ES.pdf>. Downloaded March 15, 2018.
- Conforti, V. A., De Azevedo, F. C. C., 2003. Local perceptions of jaguars (*Panthera onca*) and pumas (*Puma concolor*) in the Iguacu National Park area, south Brazil. *Biological Conservation*. 111, 215-221.

- Díaz, S., Demissew, S., Carabias, J., Joly, C., Lonsdale, M., Ash, N., ... Bartuska, A., 2015. The IPBES Conceptual Framework—connecting nature and people. *Current Opinion in Environmental Sustainability*. 14, 1-16.
- Don Carlos, A. W., Bright, A. D., Teel, T. L., Vaske, J. J., 2009. Human–black bear conflict in urban areas: an integrated approach to management response. *Human Dimensions of Wildlife*. 14, 174-184.
- Eeden, L.M., Crowther, M.S., Dickman, C.R., Macdonald, D.W., Ripple, W.J., Ritchie, E.G., Newsome, T.M., 2018. Managing conflict between large carnivores and livestock. *Conservation Biology*. 32, 26-34.
- Fontúrbel, F.E., Simonetti, J.A., 2011. Translocations and human-carnivore conflicts: problem solving or problem creating? *Wildlife Biology*. 17, 217–224.
- Franklin, W.L., Johnson, W.E., Sarno, R.J., Iriarte, J.A., 1999. Ecology of the Patagonia puma *Felis concolor patagonica* in southern Chile. *Biological Conservation*. 90, 33-40.
- Fraser, A., 2006. Public attitudes to pest control: a literature review. Science & Technical Publication, Department of Conservation. Wellington, New Zealand.
- Gálvez, N., Guillera-Aroita, G., St John, F.A., Schüttler, E., Macdonald, D.W., Davies, Z.G., 2018. A spatially integrated framework for assessing socioecological drivers of carnivore decline. *Journal of Applied Ecology*. 55, 1393-1405.
- Heneghan, M. D., 2016. Evaluating public attitudes toward growing Black bear populations in Alabama. Doctoral dissertation, Auburn University. Auburn, Alabama. 121 pp.
- INE, 2007. VII Censo Nacional Agropecuario y Forestal 2007. Instituto Nacional de Estadísticas. Santiago, Chile. Available at: <http://www.ine.cl/estadisticas/economicas/estad%C3%ADsticas-agropecuarias?categoria=Censos%20Agropecuarios>. Downloaded June 7, 2018.
- INE, 2017. Encuesta ganado ovino. Rebaños de 60 y más cabezas según región y provincia seleccionada 2017. Instituto Nacional de Estadísticas. Santiago, Chile. Available at: <http://www.ine.cl/estadisticas/economicas/estad%C3%ADsticas-agropecuarias?categoria=Estad%C3%ADsticas%20Agr%C3%ADcolas>. Downloaded June 7, 2018.
- Linnell, J.D.C., Smith, M.E., Odden, J., Kaczensky, P., Swenson, J.E., 1996. Carnivores and sheep farming in Norway. 4. Strategies for the reduction of carnivore-

- livestock conflicts: a review. Oppdragsmelding 443. Norwegian Institute for Nature Research, Trondheim, Norway.
- Linnell, J.D.C., Odden, J., Smith, M.E., Aanes, R., Swenson, J., 1999. Large carnivores that kill livestock: do “problem individuals” really exist? *Wildlife Society Bulletin*. 27, 698-705.
- Liordos, V., Kontsiotis, V.J., Georgari, M., Baltzi, K., Baltzi, I., 2016. Public acceptance of management methods under different human–wildlife conflict scenarios. *Science of the Total Environment*. 579, 685–693.
- Manfredo, M.J., Dayer, A.A., 2004. Concepts for exploring the social aspects of human–wildlife conflict in a global context. *Human Dimensions of Wildlife*. 9, 1-20.
- Manfredo, M.J., Vaske, J., Teel, T., 2003. The potential for conflict index: a graphic approach to practical significance of human dimensions research. *Human Dimensions of Wildlife*. 8, 219-228.
- Manfredo, M.J., Zinn, H.C., Sikorowski, L., Jones, J., 1998. Public acceptance of mountain lion management: a case study of Denver, Colorado, and nearby foothills areas. *Wildlife Society Bulletin*. 26, 964-970.
- Marchini, S., 2014. Who’s in conflict with whom? Human dimensions of the conflicts involving wildlife. *Applied ecology and human dimensions in biological conservation*. Springer, Berlin, Heidelberg. 189-209.
- Montecino-Latorre, D., San Martín, W., 2018. Evidence supporting that human-subsidized free-ranging dogs are the main cause of animal losses in small-scale farms in Chile. *Ambio*. DOI: <https://doi.org/10.1007/s13280-018-1066-3>.
- Moreira-Arce, D., Ugarte, C.S., Zorondo-Rodríguez, F., Simonetti, J.A., 2018. Management tools to reduce carnivore-livestock conflicts: current gap and challenges. *Rangeland Ecology & Management*. 71, 389-394.
- Olszańska, A., Solarz, W., Najberek, K., 2016. To kill or not to kill-practitioners’ opinions on invasive alien species management as a step towards enhancing control of biological invasions. *Environmental Science & Policy*. 58, 107–116.
- Redpath, S.M., Young, J., Evely, A., Adams, W.M., Sutherland, W.J., Whitehouse A., Gutierrez, R.J., 2013. Understanding and managing conservation conflicts. *Trends in Ecology & Evolution*. 28, 100-109.

- Sakurai, R., Jacobson, S.K., 2011. Public perceptions of bears and management interventions in Japan. *Human-Wildlife Interactions*. 5, 123-134.
- Schwartz, C.C., Swenson, J.E., Miller, S.D., 2003. Large carnivores, moose, and humans: a changing paradigm of predator management in the 21st century. *Alces*. 39, 41-63.
- Sillero-Zubiri, C., Laurenson, M.K., 2001. Interactions between carnivores and local communities: Conflict or co-existence? *Conservation Biology Series-Cambridge*. 282-312.
- Silva-Rodríguez, E.A., Soto-Gamboa M., Ortega-Solís, G.R., Jiménez, J.E., 2009. Foxes, people and hens: human dimensions of a conflict in a rural area of southern Chile. *Revista Chilena de Historia Natural*. 82, 375-386.
- Soto, N., 2001. Impacto de la fauna silvestre en la producción agropecuaria de Magallanes. Informe Técnico, Servicio Agrícola y Ganadero. Punta Arenas. Chile. 27 pp.
- Travaini, A., Zapata, S.C., Martínez-Peck, R., Delibes, M., 2000. Percepción y actitud humanas hacia la predación de ganado ovino por el zorro colorado (*Pseudalopex culpaeus*) en Santa Cruz, Patagonia argentina. *Mastozoología Neotropical*. 7, 117-129.
- Treves, A., Karanth, K.U., 2003. Human-carnivore conflict and perspectives on carnivore management worldwide. *Conservation Biology*. 17, 1491-1499.
- Vaske, J.J., Beaman, J., Barreto, H., Shelby, L.B., 2010. An extension and further validation of the potential for conflict index. *Leisure Science*. 32, 240–254.
- Vaske, J.J., Needham, M.D., Newman, P., Manfredo, M.J., Petchenik, J., 2006. Potential for conflict index: Hunters' responses to chronic wasting disease. *Wildlife Society Bulletin*. 34, 44-50.
- Veitch, C.R., Clout, M.N., 2001. Human dimensions in the management of invasive species in New Zealand. In: McNeely, J.A. (Ed.), *The great reshuffling: human dimensions of invasive alien species*. IUCN, Gland, Switzerland and Cambridge, U.K. 63–71.
- Wittmann, K., Vaske, J. J., Manfredo, M. J., Zinn, H. C., 1998. Standards for lethal response to problem urban wildlife. *Human Dimensions of Wildlife*. 3, 29-48.

- Woodroffe, R., 2000. Predators and people: using human densities to interpret declines of large carnivores. *Animal Conservation*. 3, 165–173.
- Zinn, H. C., Manfredo, M. J., Vaske, J. J., Wittmann, K., 1998. Using normative beliefs to determine the acceptability of wildlife management actions. *Society & Natural Resources*. 11, 649-662.
- Zorondo-Rodríguez, F., Reyes-García, V., Simonetti, J.A., 2014. Conservation of biodiversity in private lands: are Chilean landowners willing to keep threatened species in their lands? *Revista Chilena de Historia Natural*. 87:4. DOI: <https://doi.org/10.1186/0717-6317-87-4>.

Annex 1

1. ¿Cuál es su edad?

2. ¿Cuál es su sexo?

Femenino/Masculino

3. ¿Cuál es su nivel de educación?

E. Básica completa / E. Media completa / E. Superior / Ninguno

4. ¿Cuál es su profesión u oficio?

5. Comuna en la que reside

6. ¿Cuánto tiempo ha vivido en la comuna?

7. ¿Dónde vivía antes?

PUMA

8. Si ve un **Puma** en una **zona rural**, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

9. Si ve un **Puma** en un **vecindario**, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

10. Si ve un Puma atacando fauna nativa, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

11. Si ve un Puma atacando ganado, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

12. Si ve un Puma atacando a una persona, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

PERRO SILVESTRE O ASILVESTRADO

13. Si ve un perro silvestre o asilvestrado en una zona rural, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

14. Si ve un perro silvestre o asilvestrado en un vecindario, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

15. Si ve un perro silvestre o asilvestrado atacando fauna nativa, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

16. Si ve un perro silvestre o asilvestrado atacando ganado, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

17. Si ve un perro silvestre o asilvestrado atacando a una persona, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

ZORRO CULPEO O COLORADO

18. Si ve un Zorro Culpeo o Colorado en una zona rural, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

19. Si ve un Zorro Culpeo o Colorado en un vecindario, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

20. Si ve un Zorro Culpeo o Colorado atacando fauna nativa, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

21. Si ve un Zorro Culpeo o Colorado atacando ganado, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

22. Si ve un **Zorro Culpeo o Colorado atacando a una persona**, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

ZORRO CHILLA

23. Si ve un **Zorro Chilla** en una **zona rural**, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

24. Si ve un **Zorro Chilla** en un **vecindario**, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

25. Si ve un Zorro Chilla atacando fauna nativa, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

26. Si ve un Zorro Chilla atacando ganado, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

27. Si ve un **Zorro Chilla atacando a una persona**, ¿qué tan de acuerdo o en desacuerdo se encuentra con las siguientes acciones?

- Asustar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- No hacer nada

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Relocalizar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)

- Cazar al animal

Muy en desacuerdo (-2) / Desacuerdo (-1) / Neutral (0) / De acuerdo (1) / Muy de acuerdo (2)