

Perception of mexican hunters toward exotic game species

Percepción de los cazadores mexicanos respecto de las especies exóticas

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Abstract

In Mexico, there is limited research about the perception of hunters toward wildlife or their motivations to engage in sport hunting. This article focuses on exotic wild game since they are included in the national wild life regulations. Data was collected during 2014 and it was open to hunting associations, groups and individual hunters in the country. To collect the data, an email survey was sent to ninety hunters. Results showed that participants were pleased with the availability of exotic game; also, results showed that even if participants are aware of the availability of endangered exotic game listed on any law, they would not hunt them. Participants' prime motivations for hunting were enjoying nature and obtaining a trophy animal, leaving behind other motivations such as hunting for food or being socially accepted in a given group.

Key words: *exotic game species; hunting; hunters; Mexico.*

Resumen

En México hay poca investigación acerca de la percepción de los cazadores deportivos respecto de sus principales motivos para cazar animales silvestres. En este artículo la temática se delimita en especies cinegéticas exóticas, toda vez que forman parte de un esquema de regulación nacional. La información fue recabada en el año 2014 y se

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abrió a asociaciones, grupos y cazadores independientes del país. La vía de acopio de datos fue a través de encuestas enviadas por correo electrónico a noventa cazadores. Los resultados muestran que los participantes están de acuerdo con la disponibilidad de estas especies, pero no cazarían una especie exótica protegida por las leyes ambientales. Las motivaciones principales para cazar fueron pasar tiempo en la naturaleza y obtener un trofeo, dejando atrás factores como cazar por comida y para ser aceptados en algún grupo o sociedad.

Palabras clave: *cacería deportiva; especies exóticas; cinegético; México.*

Introduction

Sport hunting is a popular and profitable industry. Some of the most serious sport hunting tourists are willing to pay to travel around the world to experience new places, new emotions and new goals (Curtin, 2010). Sport tourism translates into monetary income for local economies especially in developing countries. This form of tourism facilitates greater incomes in such countries by allowing a sustainable use of natural resources (Lindsey, Roulet, & Romañach, 2007). In the United States of America hunters spend US \$22.9 billion annually on hunting; this includes the purchase of hunting licenses, equipment, hotels, gas, restaurants, etc. (Duda, Jones, & Criscione, 2010).

Recently, a new economic alternative has been implemented in some states of Mexico such as Tamaulipas, Nuevo Leon and Coahuila, in the northeastern part of the country (Villarreal G. J, 1999), and Quintana Roo and Campeche, in the south, by allowing both national and foreign hunters to come to their lands and hunt for trophy animals (Lechuga, 2001). The most popular game species in Mexico is the whitetail deer (*Odocoileus virginianus*) found in most parts of the country; however, the subspecies *texanus* is the most wanted species by sports hunters because of its bigger antlers (Villarreal G. J, 1999). According to the National Association of Diversified Ranch Owners and Wildlife Breeders (ANGADI in Spanish) in its 2013–2014 hunting season report, an average of more than 4,200 hunting permits were issued for all species during the last 15 hunting

seasons (1999–2000 through 2013–2014). Of these permits, 2,994 were for the texanus subspecies only; the rest were for other subspecies of whitetail deer, waterfowl, and other game animals including exotics (ANGADI, 2014).

In an attempt to diversify the game and to provide year-round hunting opportunities, some ranches have introduced exotic species (Butler, Teaschner, Ballard, & McGee, 2005). Exotic species refers to all non-native species present in a given area; exotic game species are all of those that have game status in at least parts of their distribution in the country (Demarais & Osborn, 1989). There are controversial viewpoints regarding the introduction of exotic species into an ecosystem. According to some authors, such as Pyšek and Richardson (2010), and Laikre, Schwartz, Waples, and Ryman (2010), exotics turn into invasive species, disrupting the balance of the ecosystem and affecting not only animal and plants but also their restoration processes. Yet, on the other hand, Butler et al. (2005) stated that there are positive aspects for conservation by introducing non-native species to the ecosystem.

The introduction of exotic species to some ranches for hunting has increased in Mexico. The ranchers and hunters are expected to know and understand the law and be aware of the negative effects that invasive species may cause to the local biodiversity. In addition, in Mexico, wildlife legislation requires everyone who wants to introduce any exotic species to the country to request authorization from the Secretary of Environment and Natural Resources (SEMARNAT), submit a management plan, and ensure that species will be confined (Secretaria de Medio Ambiente y Recursos Naturales, 2012). However, literature on hunting exotic species in Mexico is limited.

This study sought to assess the motivations of hunters from Mexico to hunt exotic game species and their understanding of exotic game species. More specifically, the purpose of this study was to assess the following: (a) the perception of Mexican hunters toward exotic and endangered game species on ranches, and (b) hunters' motivations for engaging in hunting activities.

The results of this study will allow managers and wildlife officials to identify key areas to develop programs to educate hunters and ranchers about the benefits or disadvantages of having this type of wildlife on their lands.

Literature review

Motivations for hunting

An understanding of hunters' motivations is really important for a number of reasons. First of all, motivation is considered to be the fundamental force behind all human behavior since it arouses, integrates and directs behavior and serves as a starting point to study tourist and travelers' behavior. Moreover, motivation drives individual choices and helps to explain the preferences for participating in certain leisure activities and their destinations (Radder, Mulder, & Han, 2013).

In order to measure motivations, the Leisure Motivation Scale defines four motivation categories: (a) motives with a mental and intellectual component including elements like learning, discovering, thinking and imagining; (b) motives with a social component, such as the need for interpersonal relationships, friendships, and the esteem of others; (c) motives with a physically challenging component derived from the need for challenges, competition, mastery, and achievement; and (d) motives to avoid any social contact and seek solitude, calm, and rest (Beard & Ragheb, 1983).

In the case of hunting, motivation for some people is to immerse themselves in a primitive activity where a person can get his or her own food; however, in modern times, most people do not need to hunt to bring food to the table and doing so might be viewed as trying to gain some kind of status among family or friends (Bauer & Herr, 2004). Other reported motivations for hunting include spending time with nature, the challenge of immersing on a hunt, desire of adventure, spending time with family/friends, escaping everyday problems, stress relief, and obtaining trophies (Decker & Connelly, 1989; Frawley, 2005). These previous motivations are consistent with those reported by Luloff et al. (2004). In the light of the previous discussion, it can be said that the hunting experience is the greatest motivation to engage in the activity. However, there will be situations where hunters desire certain non-native species in order to accomplish some of the goals previously stated. Because of this, in an attempt to diversify hunting opportunities many ranchers have introduced exotic game species on their property (Demarais & Osborn, 1989).

Overview of exotic game species

Ballouard, Brischoux, and Bonnet (2011) identified six classes of human interference that undermine the processes and functions of the ecosystem: (1) loss of the habitat, (2) fragmentation of the habitat, (3) overexploitation of the natural resources, (4) the spread of exotic species and diseases, (5) pollution, and (6) climate change. For the purposes of this research, the focus is only on the fourth factor: the spread of exotic species and diseases. The definition of exotic species is consistent among the authors writing about them. Mayr (1963) defined species as entities with identical characteristics that cannot reproduce with other species and may evolve as an internal transformation or splitting into two if a population is isolated from the main body of the species. The term exotic species is defined as any species living outside its natural distributional range caused by human activities either accidental or deliberate. Exotic species refers to those organisms living outside their natural ranging area even if they occur in the same geographic zone or continent (Guo & Ricklefs, 2010).

The presence of any non-native species in a given habitat is considered by biologists as detrimental with or without any proof that they cause damage (Prévoit-Julliard, Clavel, Teillac-Deschamps, & Julliard, 2011). It is very important that when an exotic species is found in a new habitat, authorities act quickly to stop the spread of the species throughout the ecosystem. It is estimated that in the U.S., every dollar spent in early control and prevention returns an average of \$17 in prevented expenditure (Caplat & Coutts, 2011).

There are many examples of damage by exotic species that have been detrimental to natural resources. One of the most notorious cases of invasive species in the United States is the wild hog (*Sus scrofa*), which has caused severe damage in a great part of the country. It is estimated that 2–6 million wild hogs are present in at least 39 states and four Canadian provinces, and the most serious part of this statistic is that half of them are in Texas (Morthland, 2011).

Hogs, wild or otherwise are non-native to the United States and the American continent; they were brought by Christopher Columbus and introduced to the Caribbean, and Hernando de Soto took them to Florida

(Morthland, 2011). In the 1930s Eurasian wild boars were brought to Texas and released for hunting, causing them to breed with already free-ranging hogs. Wild hogs were not a major problem in Texas until after the mid 1980s when they became popular for hunting, at which time ranch owners began to capture some populations, sell them, and introduce them into other parts of the state (Morthland, 2011).

The United States is not the only country having problems with uncontrolled wild hog populations; Mexico has already started to have overpopulation issues in some parts of the country. An indicator of the growing population of this species may be found in the 2014 ANGADI (2014) report. The statistics indicate there was an average of 248 permits for hunting wild hogs, most of them in Northeast Mexico; its peak season was in 2009–2010, with 469 permits given.

One of the places with high wild hog population in Mexico is the Sierra La Laguna Biosphere Reserve, located in the northwestern state of Baja California Sur (Solís-Cámara, Arnaud-Franco, Álvarez-Cárdenas, Galina-Tessaro, & Montes-Sánchez, 2009). In Sierra La Laguna, Solís-Cámara et al. (2009) found presence of wild hogs in 62.5% of the reserve, but their results do not show any conclusions regarding whether the hogs are causing a negative impact on the forest. Although many authors state that there are more problems than benefits in bringing exotic species to any ecosystem, there are others who support the idea that there are positive consequences to introducing them. For example, in his research about the wild hog population at Sierra La Laguna Biosphere Reserve, Solís-Cámara et al. (2009) found that local villagers benefit from that population since they use them as an alternative food source and even think that the wild hog meat is better than the domestic pigs' because of wild hog feeding habits, which consists mostly of acorns.

However, most scientists support the idea of eradicating exotic species to try to restore the ecosystems to their original status; unfortunately, humans constantly modify the environment, making this solution very difficult. On the other hand, a well-managed and delineated zone could work for conservation of certain threatened non-native species. It is all about finding a good balance between scientists, people, and the media

to ensure that all of the efforts to protect the environment are going in the same direction. That is why in his research, Prévot-Julliard et al. (2011) suggested that people should be more involved with scientists regarding exotic species and have balanced perceptions; otherwise, people may start losing confidence in scientists because they consider those exotic species as people's biodiversity.

Exotic species can contribute to cultural services and provide recreational opportunities such as trophy hunting and fishing. In contrast, many of the problems that humans face today with exotic species are because many of them were introduced for either hunting or fishing and became out of control (Prévot-Julliard et al., 2011). If well managed, exotic game hunting will cause a minimal negative impact to the habitat or native species and may help to preserve the populations of exotic species that are threatened or endangered in their natural habitats (Demarais & Osborn, 1989).

Unfortunately, in Mexico there are no studies about what people and hunters think about exotic game species. The lack of availability of hunters' education courses in the country and the fact that it is not mandatory to take one in order to purchase a hunting license or tag is problematic. Therefore, this situation has created a need to assess the knowledge and opinions from hunters about exotic game species as well as their motivations to hunt.

Method

Data collection and measurement

Data were gathered through the use of an online survey. A structured questionnaire was developed and divided into three sections in order to obtain data about exotic game species. The first section was about opinions regarding exotic game species; the second section focused on motivations for hunting. In these two sections participants were asked to use a 5-point Likert scale to rate their level of agreement (1 = *strongly disagree* and 5 = *strongly agree*) with each of the statements. The third section was developed in order to obtain a profile of each hunter. General information questions were asked giving the participants multiple-choice responses. In order to develop each section, specialized literature, more specifically,

articles about exotic game hunting were reviewed and used as a basis to write the questions. The list of questions on hunting motivations was based on the studies conducted by Bauer and Herr (2004), Decker and Connelly (1989), and Frawley (2005), which assessed a series of motivations to sport hunt in South Africa and the United States.

Due to issues of confidentiality, the researchers did not have access to the names of the participants. Only emails of hunters registered in hunting clubs were requested in order to distribute the survey; the email list was obtained by talking to presidents of the clubs and explaining the reasons for the research. The reason for recruit participants from hunting clubs in Mexico is that in order to obtain a license to carry hunting firearms, the hunter must be a member of a hunting club (Secretaria de la Defensa Nacional, 1972). The survey was sent via email to people registered in hunting clubs in northeast Mexico. One follow-up email was sent after one week.

Results

Profile of respondents

Ninety questionnaires were sent out with 83 participants responding to the questionnaires and leaving seven with no responses. However, only 79 were completely filled out showing a 92% response rate; the results presented here reflect all of the usable questionnaires. Of these respondents, 95% completely filled out the profile section; Table 1 summarizes the characteristics of the respondents. Three-quarters of the respondents were from northeastern Mexico (Tamaulipas, Nuevo Leon, and Coahuila), with the majority being from Nuevo Leon and Tamaulipas at 39% and 33% respectively, followed by Coahuila at 3%. After the northeastern states, 6% of the participants were from Mexico City, and while 5% were from Queretaro and Chihuahua and Veracruz with 3% each. The states of Guanajuato, Mexico, Jalisco, Michoacán, Puebla, Sinaloa, and Sonora each accounted for 1% of the respondents; the rest of the states did not have any participants.

All of the respondents were males between 21 and 72 years old; the most

Table 1

<i>Profile of hunters</i>		
Variable	Category	Percentage
State of residency	Nuevo Leon	39
	Tamaulipas	33
	Coahuila	3
	Other states	25
Age	21–30	20
	31–40	32
	41–50	12
	51–60	23
	61–67	13
Years hunting	0–10	17
	11–20	22
	21–30	24
	31–40	17
	41–50	10
Days per year hunting	51+	9
	1–10	20
	11–20	37
	21–30	26
	31–40	10
Use of a hunting guide	41+	7
	Guided	22
	Self-guided	78
Type of property most common to hunt	Friend	26
	Lease for the season	26
	Own	18
	Rent per hunt	18
	Family	10
	<u>Ejido</u>	2

common age range was between 31–40, with those respondents making up 32% of the total followed by 51 – 60 with 23%; the least popular choice was 61+ with only 13% of the respondents. When asked how many years they had been hunting, 24% of respondents stated that they had hunted between 21 and 30 years followed 11 – 20 years with 22%; 0 – 10 and 31 – 40 had 17% each leaving 41 – 50 with 10% and 51+ years in last place with 9%. For days spent hunting per year, 37% stated that they hunt between 11

and 20 days a year, 26% of participants hunt 21 – 30 days per year followed 1 – 10 with 20%, 31 – 40 with 10% and 41+ with 7%.

Only 22% of respondents used a guide while going hunting while 52% hunted either on a friend’s property or procured a lease for the season (26% each) and only 18% hunted on their own property, the least popular type of property for hunting was ejido with only 2%.

Motivations for hunting

Of the participants, 97% completely filled out this section. Table 2 summarizes the motivations for hunting found among the participants. Participants were asked to state their level of agreement on a 5-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

As the results show, enjoying nature is the biggest motivation for hunters to go out (Mn = 4.65); almost every participant strongly agreed with this statement. Pursuing a trophy was the second most important motivation with a mean score of (Mn = 4.45) followed by the challenge of the hunt and

Table 2
Mean scores for hunters’ motivations

Statement	Mean	S.D.
Food	2.85	1.42
Trophy	4.45	1.07
Spend time with family/friends	4.38	1.03
Stress relief	3.91	1.36
Enjoy nature	4.65	0.88
Challenge of the hunt	4.35	1.07
Desire for adventure	4.21	1.11
To be socially accepted in a group of people	1.7	1.19
Wildlife management	3.86	1.24
To help the economies of rural people	3.91	1.3

desire for adventure which were next in motivating the hunters, with (Mn = 4.35) and (Mn = 4.21), respectively.

The results showed also that stress relief (Mn = 3.91) and spending time with family and friends were important motivations for hunting (Mn = 4.38), while trying to be accepted by a group of people (family, friends, co-workers, clubs, or associations) was the least popular motivation (Mn = 1.7). Respondents felt that hunting is a wildlife management tool (Mn=3.86) and does help the economies of rural communities (Mn = 3.91) but was not as strong a motivation as the rest, possibly because almost 100% of the respondents reported commonly hunting on private ranches instead of communal land. The finding that more than half of the respondents either hunted on a friend's property or leased for the season implied that there is less of a need for people from rural areas to hunt.

Perceptions toward exotic game species

Table 3 summarizes the perceptions of the hunters toward exotic game species. The completion rate of this section was 97% of participants. To gather this information, participants were asked to state their level of agreement with a series of statements (shown in Table 3) using a 5-point Likert scale, with 1 being *strongly disagree* and 5 being *strongly agree*.

The results (Mn = 4.39) showed that year-round exotic game hunting is a good alternative to seasonal hunting provided by most native game, and it also provides more game variety (Mn = 4.17) to the hunting lands. Also, the findings (Mn = 4.47) showed hunters' agreement with management of endangered exotic game species. This statement obtained the highest score of all; however, the least popular of all of the statements was the option about the possibility of hunting an endangered exotic game species, with a score of (Mn = 2.49), which contrasts with the results of the question about whether endangered exotic game species should be available for hunting (Mn = 3.65).

When assessing the possibility of hunting exotic game species, most of the respondents (Mn = 4.24) stated that, if possible, they would like to

Table 3

Perception about exotic/endangered game species

Statement	Mean	S.D.
Exotic game species increase game diversity on hunting land to provide the hunter with more game variety	4.17	1.29
Exotic game species deteriorate the ecosystem, affecting native flora and fauna	3.05	1.33
Exotic game species compete with native wildlife for space and food	3.8	1.25
Exotic game species should be confined in high-fenced areas	4.06	1.53
Having exotic game species increases the price to hunt native wildlife	2.46	1.34
Exotic game species provide year-round hunting opportunities	4.39	1.05
It is more affordable to hunt exotic game species in Mexico than traveling abroad to hunt the same species in their native land	4	1.19
Endangered exotic game species should be available for hunting	3.65	1.5
Managing endangered exotic game species helps their preservation	4.47	1.13
If possible, I would like to hunt an exotic game species	4.24	1.25
If possible, I would like to hunt an endangered exotic game species	2.49	1.61

hunt them since it is more affordable to do so in Mexico than traveling abroad (Mn = 4). Participants of the study did not consider the high costs to create and operate a hunting ranch with exotic game a determining factor in increasing the prices of native game species having a result of Mn = 2.46.

Hunters were also asked about their level of agreement regarding how dangerous exotic species are to the ecosystem. The result (Mn = 3.05) showed that they were neutral in their opinion about that statement; however, respondents did think that exotic species compete with native species for space and food (Mn = 3.8), and they agreed that they should be confined (Mn = 4.06) in high-fenced areas to prevent them from roaming and dispersing in the ecosystem.

Discussion

The distribution of the participants corresponds to a trend indicated by Villarreal (1999), who stated that the largest proportion of hunters in Mexico resides in the northeastern part of the country because of the main two species available for hunting in the country (whitetail deer and white-winged dove) and its proximity to the United States of America.

Our findings regarding age, differ with those found by Luloff et al. (2004) where deer hunters in Pennsylvania are older than those in Mexico. Another finding show that Pennsylvania hunters have been hunting for more years than Mexican hunters. Also, the amount of days spent hunting per year could be related to the fact that Texas whitetail deer is the most popular game species in Mexico (Villarreal, 1999) during the winter months when there are usually vacations for people.

Regarding the type of property hunted, most of the participants went to either friend's property, or leased for the season followed by own property and rent per hunt; this result could be due to the fact that most land in Mexico is privately owned and *ejidos* are not very common nowadays (Weber, Garcia-Marmolejo, & Reyna-Hurtado, 2006).

Our findings regarding hunting motivations are very similar to the ones found by Decker and Connelly (1989), which also discovered that being in contact with nature was hunters' main motivation. Pursuing a trophy was the second most important motivation followed by the challenge of the hunt and desire for adventure, this result might be due to the use of different techniques for hunting. One of those techniques, spot and stalk represents a real challenge since most big game animals do not have a predictable behavior and the hunter must chase them in order to try to have a close shot at the animal, thereby increasing the challenge of the hunt (Adams, 2013). These results also indicate that most of the hunters completely disagree with engaging in hunting in order to gain acceptance with more people as suggested by Bauer and Herr (2004).

Respondents felt that hunting is a wildlife management tool since it helps preserving species including those with a threatened/endangered status (Demarais & Osborn, 1989 and Stedman et al. 2004). Participants

did not consider helping the economies of rural communities not strong motivation as the rest, this might be the reason why Weber et al. (2006) found that sport hunting has failed to bring economic benefits to rural people, this could possibly be due to the fact that almost 100% of the respondents reported commonly hunting on private ranches instead of communal land. The finding that more than half of the respondents either hunted on a friend's property or leased for the season implied that there is less of a need for people from rural areas to hunt.

In general, the results show that hunters' motivations are all of those involving the hunting experience leaving behind hunting for food and to be socially accepted within a group of people. These results are consistent with those found by Luloff et al. (2004) where deer hunters rated enjoying nature, spending time with family, stress relief and hunting for food as less important motivations.

The results strengthen Demarais & Osborn (1989) findings that year-round exotic game hunting is a good alternative to seasonal hunting, it helps in the preservation of endangered species and it also provides more game variety which at the end translates into more economic earnings for the ranchers since it is more affordable to hunt exotic species in Mexico to go to their native lands to do it.

Participating hunters were neutral in their opinion about the statement that exotic species damage the ecosystem, regardless of what Pyšek and Richardson (2010) suggested about the possibility of exotic species leading native species to extinction in some cases. However, hunters agree that there is competition for food, space and shelter with native species and agreed with the law that they should be confined in high-fenced areas to prevent them from roaming and dispersing in the ecosystem (Secretaria de Medio Ambiente y Recursos Naturales, 2012).

Our results found that hunters are not willing to hunt an endangered exotic game species. A reason for this situation might be that hunters' have the same reasoning of Moore (2006), about sport hunting leading those species to their extinction. This results contradicts the hunters' themselves since they do not completely disagree with the statement of endangered exotic game species being available for hunting and their management helping their preservation as discussed above.

Certainly, different countries have different cultures and ways of thinking; however, the findings of this study largely coincide with most of past research conducted in other countries in terms of motivation for hunting and perceptions toward exotic game species.

Conclusions

Individuals' motivations for hunting have been very well documented in the United States and other parts of the world, as have individuals' perceptions about exotic game and non-game species; however, there are no such studies in Mexico, where this activity has become more popular in the past decades. This research attempted to contribute to the body of knowledge on the motivations of Mexican hunters to hunt and their perceptions toward exotic game species. Because of the lack of information and studies of this type, the results may assist wildlife officials in implementing strategies to develop better hunter education courses and may also help ranchers, outfitters, and wildlife officials in developing marketing strategies to better meet hunters' desires and enhance their satisfaction.

In relation to the perception toward exotic game species, the results showed that participants had a neutral opinion about exotic species being detrimental to the ecosystem; however, they recognized that native fauna has to compete with non-native fauna for food, space, and shelter, which may lead natives to relocate or disappear from the habitat. When participants were asked about hunting endangered exotic game species, they clearly indicated that they are not willing to hunt them, which contradicts their opinion that they agree those species should be available for hunting and their management is a positive for their populations. In general, hunters were pleased with having exotic game species available for hunting and found it more affordable to engage in a hunting trip in Mexico than to travel to exotic species' native lands. These results also show the need to better inform ranchers and hunters about the pros and cons of having exotic species in their land.

The results indicate that hunters tend to engage in the activity to enjoy nature but at the same time, they expect to obtain a trophy. The results also

indicate that hunting for food is not an important motivation anymore. In general, the results on motivations are consistent with other articles already published, although in this survey, hunters' indicated total rejection of the assumption that they hunt in order to be a part of a specific group of people. What we can learn from this is that hunters engage enjoy what the entire activity represents from going outdoors to obtaining a trophy.

References

- Adams, C. (2013). Spot and Stalk: The Art of Hunting on Foot. *Bowhunter*.
- ANGADI. (2014). Reporte de Cintillos Distribuidos Temporada 2013-2014, from <http://www.angadi.org.mx>
- Ballouard, J.-M., Brischoux, F., & Bonnet, X. (2011). Children Prioritize Virtual Exotic Biodiversity over Local Biodiversity. *PLoS ONE*, 6(8), e23152. doi: 10.1371/journal.pone.0023152
- Bauer, J., & Herr, A. (2004). Hunting and fishing tourism. In K. Higginbottom. (Ed.). *Wildlife tourism, impacts, management and planning*, 57-78.
- Beard, J. G., & Ragheb, M. G. (1983). Measuring leisure motivation. *Journal of Leisure Research*, 15(3), 219-228.
- Butler, M. J., Teaschner, A. P., Ballard, W. B., & McGee, B. K. (2005). Wildlife Ranching in North America: Arguments, Issues, and Perspectives. *Wildlife Society Bulletin*, 33(1), 381-389. doi: 10.2307/3784882
- Caplat, P., & Coutts, S. (2011). Integrating Ecological Knowledge, Public Perception and Urgency of Action into Invasive Species Management. *Environmental Management*, 48(5), 878-881. doi: 10.1007/s00267-011-9747-8
- Curtin, S. (2010). The self-presentation and self-development of serious wildlife tourists. [Article]. *International Journal of Tourism Research*, 12(1), 17-33.
- Decker, D. J., & Connelly, N. A. (1989). Motivations for Deer Hunting: Implications for Antlerless Deer Harvest as a Management Tool. *Wildlife Society Bulletin*, 17(4), 455-463. doi: 10.2307/3782713

- Demarais, S., & Osborn, D. A. (1989). Exotic big game in Texas: status of our knowledge. *Appendix A, Exotic Game in Texas: An overview of commercial potential. Texas Department of Agriculture, Texas, EUA.*
- Duda, M. D., Jones, M. F., & Criscione, A. (2010). The Economic Significance of Hunting and Fishing *The Sportsman's Voice: Hunting and Fishing in America* (pp. 161-174). State College, PA: Venture Publishing, Inc.
- Frawley, B. J. (2005). *Small game harvest and characteristics of small game hunters in Michigan, 2004*: Michigan Department of Natural Resources, Wildlife Division.
- Guo, Q., & Ricklefs, R. E. (2010). Domestic exotics and the perception of invasibility. *Diversity and Distributions, 16*(6), 1034-1039. doi: 10.1111/j.1472-4642.2010.00708.x
- Laikre, L., Schwartz, M. K., Waples, R. S., & Ryman, N. (2010). Compromising genetic diversity in the wild: unmonitored large-scale release of plants and animals. *Trends in Ecology & Evolution, 25*(9), 520-529. doi: <http://dx.doi.org/10.1016/j.tree.2010.06.013>
- Lechuga, J. (2001). *The feasibility of sport hunting as a wildlife conservation and sustainable development tool in southern Mexico*. University of Florida.
- Lindsey, P. A., Roulet, P. A., & Románach, S. S. (2007). Economic and conservation significance of the trophy hunting industry in sub-Saharan Africa. *Biological Conservation, 134*(4), 455-469. doi: 10.1016/j.biocon.2006.09.005
- Luloff, A., Finley, J., Diefenbach, D., Stedman, R., San Julian, G., Zinn, H., Matarrita, D. (2004). A comparison of hunter activities and opinions during two Pennsylvania hunting seasons. *Final Report. The Human Dimensions Unit, The Pennsylvania State University.*
- Mayr, E. (1963). Animal species and evolution. *Animal species and their evolution.*
- Moore, E. A. (2006). I'll Take Two Endangered Species, Please: Is the Commercialization of Endangered Species a Valid Activity That Should Be Permitted under the Endangered Species Act to Enhance the Survival of the Species. *Geo. Wash. L. Rev., 75*, 627.
- Morthland, J. (2011). A Plague of Pigs. [Article]. *Smithsonian, 41*(9), 52-61.

- Prévot-Julliard, A.-C., Clavel, J., Teillac-Deschamps, P., & Julliard, R. (2011). The Need for Flexibility in Conservation Practices: Exotic Species as an Example. *Environmental Management*, 47(3), 315-321. doi: 10.1007/s00267-011-9615-6
- Pyšek, P., & Richardson, D. M. (2010). Invasive species, environmental change and management, and health. *Annual Review of Environment and Resources*, 35, 25-55.
- Radder, L., Mulder, A., & Han, X. (2013). Motivations and socio-demographic characteristics of safari hunters: a south african perspective. *Academy of Marketing Studies Journal*, 17(1), 1-19.
- Secretaria de la Defensa Nacional. (1972). Ley General de Armas de Fuego y Explosivos.
- Secretaria de Medio Ambiente y Recursos Naturales. (2012). Ley General de Vida Silvestre. 27.
- Solis-Cámara, A. B., Arnaud-Franco, G., Álvarez-Cárdenas, S., Galina-Tessaro, P., & Montes-Sánchez, J. J. (2009). Research Article Evaluación de la población de cerdos asilvestrados (*Sus scrofa*) y su impacto en la Reserva de la Biosfera Sierra La Laguna, Baja California Sur, México.
- Stedman, R., Diefenbach, D. R., Swope, C. B., Finley, J. C., Luloff, A. E., Zinn, H. C., . . . Wang, G. A. (2004). Integrating Wildlife and Human-Dimensions Research Methods to Study Hunters. *The Journal of Wildlife Management*, 68(4), 762-773. doi: 10.2307/3803633
- Villarreal G. J. (1999). *Venado Cola Blanca Texano: Manejo y Aprovechamiento Cinegetico*. Monterrey, Nuevo Leon, Mexico: Union Ganadera Regional de Nuevo Leon.
- Weber, M., Garcia-Marmolejo, G., & Reyna-Hurtado, R. (2006). The Tragedy of the Commons: Wildlife Management Units in Southeastern Mexico. *Wildlife Society Bulletin*, 34(5), 1480-1488. doi: 10.2193/0091-7648(2006)34[1480:ttotcw]2.0.co;2