HUMAN CONFLICT WITH GREY WOLF(CANIS LUPS) IN DISTRICT CHITRAL, KHYBER PAKHTUNKHWA, PAKISTAN

Asim Haider*,[1], Ahmad Zamir[1], Aimal Khan[1], Muhammad Ateeq Ahmed[2], Anum Bhatti[4],

Safwan Daud[1], Faisal Ibrahim[1], Sidra Batool[1], Muhammad Zeeshan[3], Abdullah Khan[1],

Muhammad Hawad[1], Muhammad Siddique Akbar[1], Arz Muhammad urmani[1], Aqib Riaz [1],

Fayaz Ahmad [1]

1. Pakistan Forest Institute, Peshawar
2. Aga khan Rural Support Program, Gilgit
3. PMAS Arid Agriculture university, Rawalpindi
4. Punjab Forest department

Corresponding author:
Asim Haider

Abstract

Human interactions with wildlife are frequently characterized negatively, despite the existence of several beneficial advantages, including recreational, educational, psychological, and environmental services. Because "Least Concern" grey wolves (*Canis lupus*) prey on livestock, there is a substantial conflict between farmers and wildlife in many regions of the world. This conflict is a primary factor in human-wolf conflict. The current study is the first effort in the area to estimate the conflict's severity in terms of livestock destruction. On a purpose methodology basis, the study region was divided into 10 study sites. And data were gathered at each study site during field surveys. Results showed that goats are primarily responsible for depredation during the summer when livestock are allowed to freely graze in pastures, in our study area, the majority of the population is of farmers and herders, and their dependence on livestock is greater than that of any other source and is their main source of income. According to the findings of our inquiry, the grey wolf is a prevalent carnivore in the region, as indicated by the statements made by the people who live there. The town suffers a significant economic loss as a direct result of the wolf's predation on their livestock. Summer (88) had the highest depredation rate, followed by spring (65), autumn (57), and winter (55), according to our study. Local people move their animals to nearby pastures and grazing areas in the summer and spring.

On the fields, the livestock is frequently left unattended. The majority of attacks took place while there was no defense As a direct consequence of this, they held very pessimistic views of the species and worked against reducing or eliminating it entirely from their region. As a consequence of our investigation and interactions with locals, we've devised conservation methods to protect the grey wolf and limit economic impact. Daily fighting hinders grey wolf conservation in the research region. Local influentials should start a broad awareness programme. To enhance herding procedures, watch and ward conditions, scare devices, and people's attitudes toward wolves in the research region. Most individuals are misinformed about wildlife conservation and value. This baseline survey would help conserve this species in Chitral, KP.

Key Words: Wildlife, Grey Wolf, Livestock, Conflict, District Chitral.

1. Introduction

The term "human-wildlife conflict" refers to any violent encounter between humans and non-human animals...(Nyhus, 2016) activities on the part of humans or other animals that endanger wildlife or reduce the benefits they bring to humans in terms of food, medicine, revenue, and entertainment. (Mazur & Asah, 2013) or the opinion that animals pose a threat to people or their well-being, food, or property. (Peterson et al., 2010).. There are around 226 different species of carnivores, all of which are members of the order of mammals and virtually all of which are predators. Carnivores as a group have a tremendous impact on the biological ecosystems they inhabit thanks to the predation and intra - specific competition they engage in. It is common for predators to control or restrict the amount of their prey, which can have an impact on the structure and operation of entire ecological systems..(Berger et al., 2001)(Estes et al., 1998) Because their population size is typically determined by external factors such as the availability of prey, artificially increasing the density of "prey" by rearing cattle could result in an increase in the number of violent encounters. Around the world, nine of the most prevalent livestock species are preyed upon by at least two dozen species of terrestrial carnivores..(Brodie et al., 2013). onflicts between humans and wolves are extremely serious..(Dickman et al., 2011).

Even though there are numerous positive benefits, such as recreational, educational, psychological, and environmental services, human interactions with wildlife are typically

portrayed in a negative light. This is despite the fact that there are several of these benefits. As a result of this, there is a growing agreement that the phrase "human–wildlife conflict and coexistence" refers to both the recognition of problems and the possibility of potential solutions.(Clucas & Marzluff, 2013)(Nyhus, 2016) . In addition to the negative consequences on biodiversity and ecological health, human–animal conflict can also have significant negative effects on human health, protection, and welfare. There is the potential for both direct and indirect effects on human beings. Animals are capable of causing human suffering and even death in a number of different ways, including by biting, clawing, or aggressively attacking humans in other ways; colliding with automobiles, trains, aeroplanes, boats, and other forms of technology; and spreading zoonotic diseases or parasites.(Conover, 2002).

In biotaxonomic classification, the grey wolf Canis lupus (WILSON & REEDER, 2011), It is a carnivorous mammal (Mammalia, Carnivora) that is a member of the canid family, which is also known as the dog family. Canis lupus, sometimes known as the grey wolf, is the largest member of the family Canidae and may be found in both Eurasia and North America. Its distribution range is quite extensive. The distribution range of the grey wolf in Asia extends from Russia to Central Asia and China all the way to Mongolia and Northern Afghanistan.(Kabir et al., 2017), while its distribution spans the Middle East. Deserts of Saudi Arabia and Iran are connected by this vast region. (Mishra & Fitzherbert, 2004). The ability of modern wolves to survive in temperate and cold climates, having successfully occupied vast habitats ranging from the tundra to the forests and mountains in the steppes, and occurring throughout the northern hemisphere (North Asia, Europe, and North America), with the exception of tropical forests and deserts, demonstrates a remarkable capacity to adapt to climatic and environmental conditions. It is generally accepted that the wolf is the only progenitor of the contemporary dog, which is known scientifically as Canis lupus familiaris.. The Indian grey wolf is a magnificent nomad and can be found in nearly all environments; yet, it is primarily confined to the fragile pathways of arid, mountainous terrain and enormous deserts due to its sensitivity to its surroundings. (Sharma et al., 2004) In a similar fashion, it inhabits vast plains, low-rainfall grasslands, scrublands, and grazing lands. The abundance of prey and potential den sites in a grey wolf's area both play a role in determining the size of their territories, which range from 150 to 300 square kilometres on average.(Saad et al., 2015) Natural caves are occupied in mountain area (Schaller, 1975) There are a total of 32 recognised subspecies of wolves, and Pakistan is home to two of them: the

Tibetan wolf (Canis lupus chanco) and the Indian grey wolf (Canis lupus pallipes). This species was found in a variety of protected areas across the country, including the ChhumbiSurla Wildlife Sanctuary, Hingol National Park, HazarganjChiltan National Park, Kirthar National Park Cholistan, and Lal-Suhanra National Park. The Tibetan Wolf, on the other hand, lives in the barren and rocky valleys of Baltistan, Hunza, Chitral, Gilgit, Upper Swat, and Khunjerab National Park.(Rodrigues et al., 2006) Pakistan is home to two distinct kinds of wolves: the Tibetan Wolf, which lives in the mountains of the Himalayas, and the Indian Wolf, which lives in the Kashmir valley's southern regions. Despite the fact that wolves are listed as "Endangered" in Pakistan, very few research have been conducted on the diversity of their diets and their interactions with humans (one such study was conducted by). (Jammu et al., 2016) in Pakistan. It is one of the most problematic predators because it is notorious for preying on livestock and inflicting major economic losses to livestock owners. Additionally, it is noted for being one of the most elusive predators.

The most significant factor contributing to this reduction in the habitat range of wolf species is the practise of turning natural wolf habitat into farmland. This finally resulted in the instigation and escalation of human–wolf conflict over the livestock depredation, as well as an increase in people' level of antipathy against the species, which in turn led to the killing of retaliatory wolves.(Qamar et al., 2012)(Singh & Kumara, 2006). (Kumar & Rahmani, 2008). However, these attacks are extremely uncommon and are typically the result of human meddling, such as the destruction of dens and traps, as well as the persecuting of young animals. Carnivores are responsible for around 3–18% of the annual economic loss that families in the trans-Himalaya region that rely on cattle suffer. (Linnell et al., 2003)(Namgail et al., 2007) The herders have a bad opinion of the wolves because the wolves prey primarily on the livestock. When there is a greater number of livestock, there is also a greater number of wolves that prey on the livestock, which in turn leads to a bad attitude among the local people. The likelihood of livestock being preyed upon by grey wolves has grown as a result of both the rapid increase in the human population and the spread of agricultural area into the habitat of grey wolves (Hadidian, 2015). It is thought that there are approximately 200 wolves living in Pakistan, spread out across the country's whole range. It has been reported that the wolf population density is larger (1.0–1.4/100 km2) in its northern range, whereas it has been observed that the wolf population density is considerably lower (0.1/100 km2) in its southern area. (Abbas et al., 2013)(Saad et al., 2015).

2. **Material and Method**

2.1 Study area

Chitral District, which is part of Khyber Pakhtunkhwa, can be found at latitudes ranging from 350-15 to 360-55 north, and longitudes ranging from 710-12 to 730-55 east. Chitral is the largest district in all of Khyber Pakhtunkhwa and is located the farthest to the north. Chitral is characterised by a topography that is predominately hilly and incorporates a portion of the Pamir Range. It shares borders with Afghanistan on the west, the Wakhan Corridor (a 17-kilometer-long strip that separates Pakistan and Tajikistan), the northern areas of Gillgit on the east, and the Upper Dir and Swat districts on the south. Chitral has a total land area of approximately 1486648 hectares, of which approximately 10% is covered by forest, 20% is cultivable waste, and approximately 3% is cultivated land area. Land used for grazing accounts for approximately 22% of the total area, while the remaining areas are undeveloped save for pockets of cultivated land and human settlements.
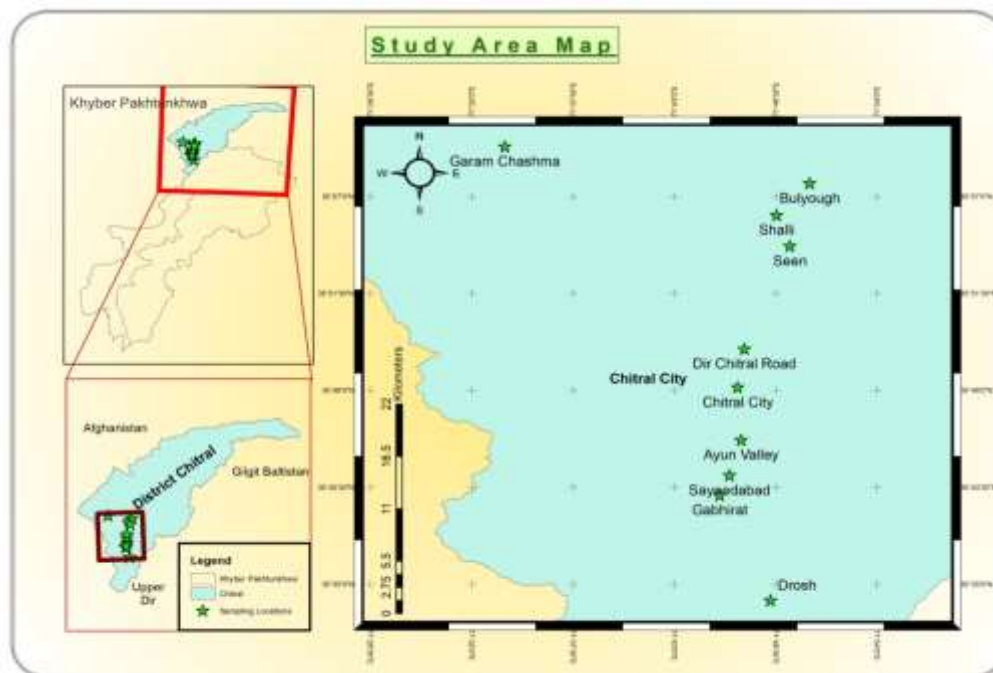

Figure No. 1: Map showing study area along with major conflict sites in District Chitral

2.2 Field survey

In the region that we are investigating, men are the only ones who participate in outside activities such as cattle grazing and sale, fodder collecting, and agriculture. Women, on the other hand, stay at home and take care of their household chores. Because of this, all of our questions were directed toward the 117 male participants. The interviewees were chosen on the basis of their prior awareness of the existence of a variety of wild animal species, in general, and the grey wolf, in particular. The majority of those who took part were local hunters, herders, farmers, citizens working in a variety of businesses, educators at secondary and tertiary levels, and high school and college students.(Mishra & Fitzherbert, 2004) During the surveys, respondents answered open-ended questionnaires (Supplementary Materials). Questionnaire surveys are used to gather information on local residents' tolerance levels and attitudes of local animal species. They're a reliable source of knowledge on local wildlife species. The questionnaire comprised 18 items, including the participant's age, household size (HH), education level, profession, monthly income, number of earning family members, farm land, quantity and types of animals, status, perceptions of the grey wolf, and human attitudes toward the grey wolf..(Berger et al., 2001). Wolves are not dangerous, dangerous, mildly dangerous, and severely dangerous to livestock. Because people's perspectives are varied, every part of this study was considered to determine the degree of the conflict in this region. Ethnicity, education, socioeconomics, and religion are factors..(Janeiro-Otero et al., 2020)(Khan et al., 2019),

2.3 Data Analysis

The opinions of the respondents towards grey wolves were classified into one of three groups: neutral (respondents whose beliefs were unclear and changed over time), positive (respondents who expressed favourable sentiments about wolves), and negative (i.e., uncomplimentary opinion). We awarded scores of 1, 2, and 3 for neutral, positive, and unfavourable attitudes, respectively, so that we could conduct statistical analysis on the data. We classified the variables according to the respondent's level of education, the age of the interviewee, the size of the household, the respondent's profession (farmer, business owner, or employee), earning members (1, 2, 3 class), agricultural land (ha), perception of the wolf population (rare, absent, or common), and the number of wolves sighted [(high, 4 above (51.28%) medium; 2-3 (48.72%), low; 0-1,] The Arc Global Positioning System was utilised in

order to generate the map of the research region (ArcGIS, version 10.2, Environmental Systems Research Institute, Redlands, CA, USA).

3. Results

3.1 Livestock Status

As was said earlier, the vast majority of people who were interviewed worked in agriculture or herding. As a result, the respondent has a greater number of goats and chickens than sheep and cattle. The vast majority of people living in the area had between one and two heads of cattle, and seldom had more than four. In order to facilitate the gathering of information and facilitate statistical analysis, the quantity of cattle is categorised into classes, and then each class is given a number
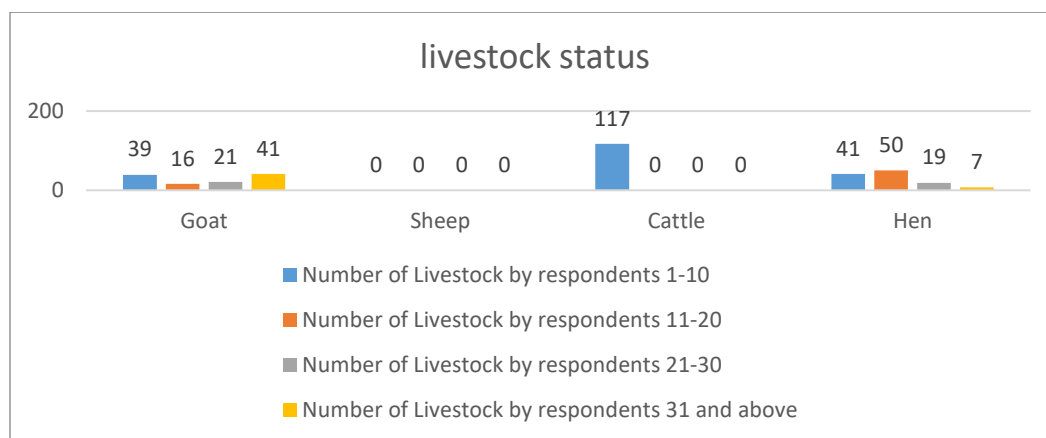

Figure No. 2: A graphical representation of the cattle

3.2 Sighting of Predators

The wolf is the most frequently seen animal, either alone or in packs, followed by the lynx, the jackal, and the snow leopard. In order to do statistical analysis, the number of individual predators is segmented according to class. According to the opinions of the locals, the number of snow leopards ranges from one to two. Those who responded that they had sighted the wolf on a scale from 1 to 10 are represented by the numbers 34, followed by 11-20 are 33, from 21-30 are 14 and above 30 it is 36 . The respondent has sighted jackals between the number of 1 and 10 are 22, followed by 11 and 20 are 56 between 21 and 30 are 21 and over 30 there are only 18.
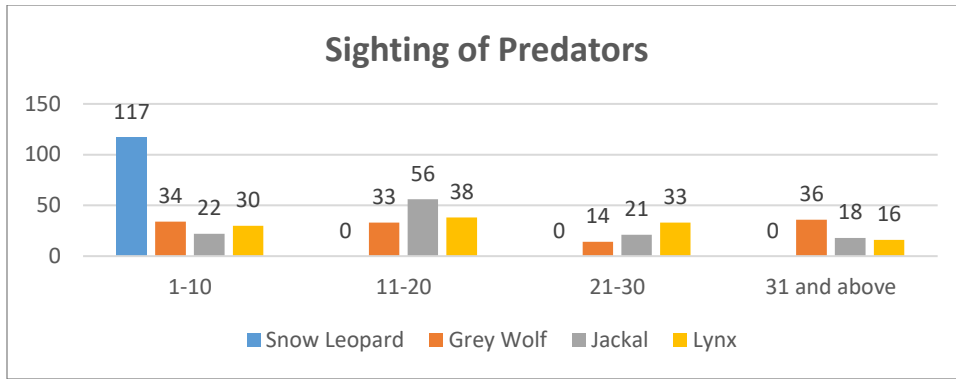
Figure No. 3: A detailed depiction of the sighting of the predator is shown

3.3 Sighting number of wolf in last year

There have been more reported sightings of wolves in the neighbourhood recently. the respondents who were interviewed, 52 of them claimed to have seen the wolf at a medium or high level (levels 2–3), and 65 of whom claimed to have seen the wolf at a high level (levels 4 and above).
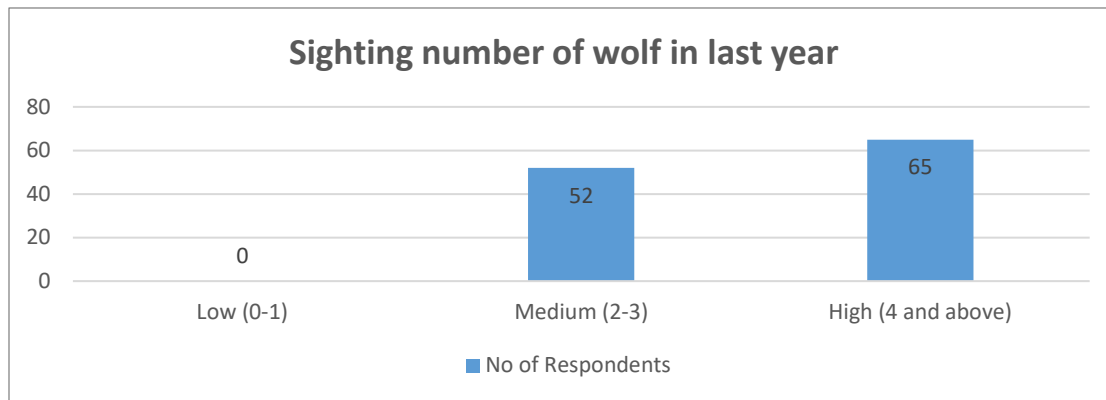

Figure No. 4: Number of wolves spotted [(low, 0-1), medium, 2–3 (48.72%), or high, 4 or above (51.28%)]. are presented in a graphical format.

3.4 Human attitude towards grey wolf

The attitudes of the respondents on grey wolves were classified into three categories: positive (respondents who shared favourable thoughts about wolves), positive, and negative (respondents who shared unfavourable thoughts about wolves) (i.e., uncomplimentary opinion). For the purpose of statistical analysis, we assigned the scores 1, 2, and 3 accordingly to positive, neutral, and negative sentiments.
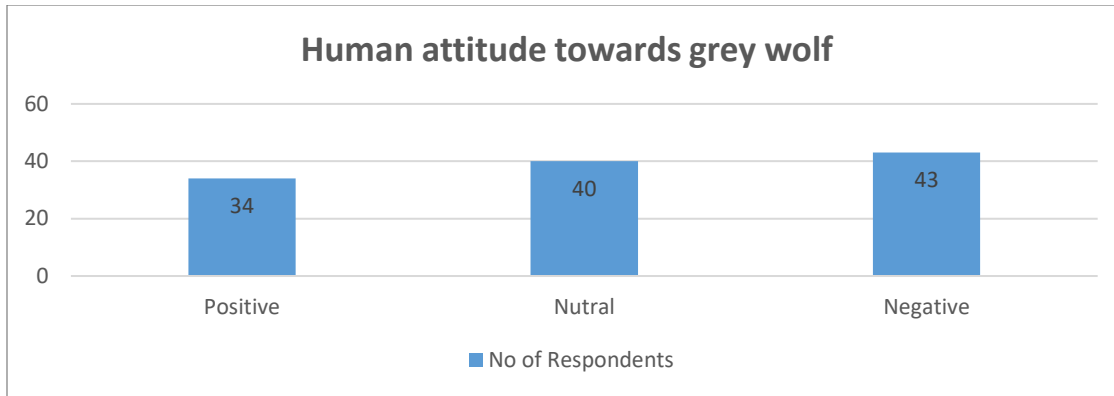
Figure No. 5: Human attitude towards grey wolf are shown graphically

3.5 Predation by grey wolf during season

Summer had the highest predation (88), following spring, fall, and winter (55). During the spring and summer, locals transfer their animals to surrounding pastures and grazing areas. When herders have other commitments, cattle are often left unattended in meadows. In this case, wolves have an advantage and are more inclined to attack abandoned livestock. Most animal attacks happen during the day, when they're free to graze and unprotected. As the wolf comes down for the winter, it hunts at night. Local residents and animals can be attacked. According to residents, 78.21% of cow depredations occurred in nearby woodlands or pastures. Animals left unattended to graze in these locations are vulnerable.
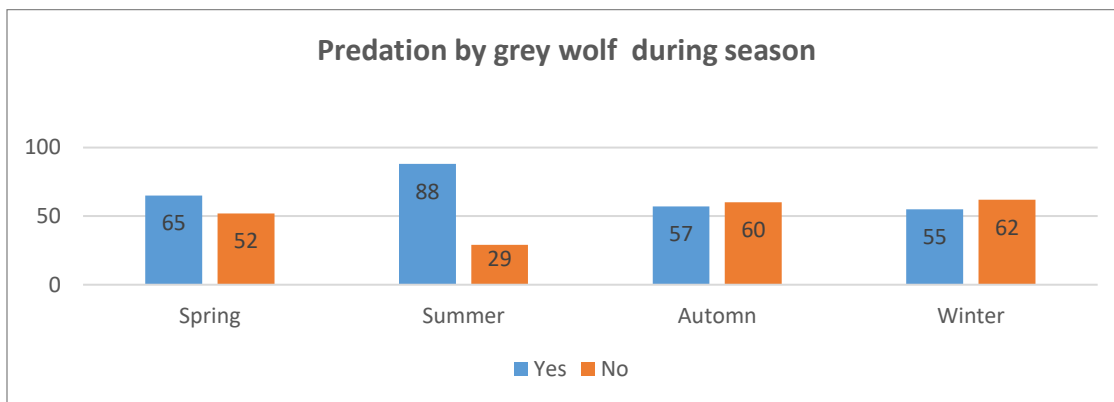

Figure No. 6: Grey wolf predation over the seasons

3.6 Prey type and number

The wolf had a greater number of successful predations on goats due to the goat's medium body size, whereas the hen was the next most successful prey item due to its small body weight. According to the statements of the 84 respondents, the grey wolf was responsible for the depredation of their goats with an average of 71.79%. The hen comes in second due to its diminutive size and frail constitution, scoring an average of 50% respectively. because they do

not have sheep, and the cattle that they do have are less in number but have a more rounded body form. As a result, their acts of depredation are negligible and almost nonexistent. For the sake of statistical analysis, the number of instances of predation on livestock are broken down into groups and given classes ranging from 1-5 (1), 6-10 (2), 11-15 (3), and 16 and above (4).
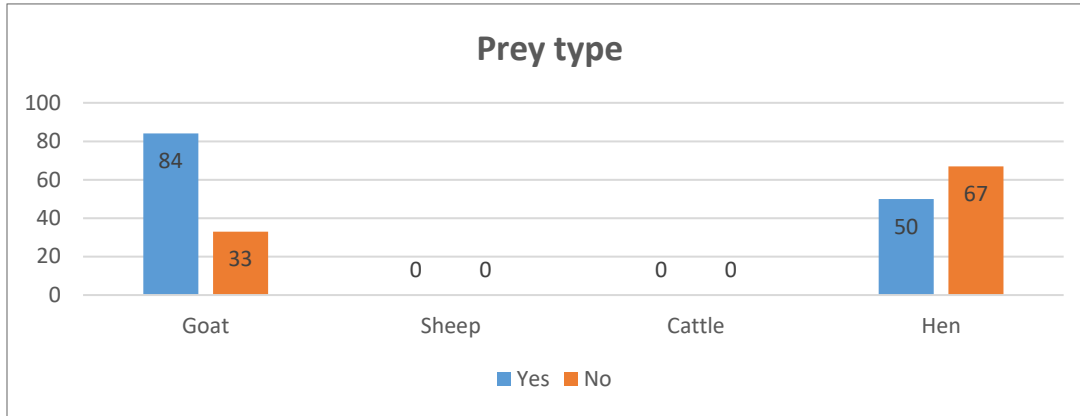
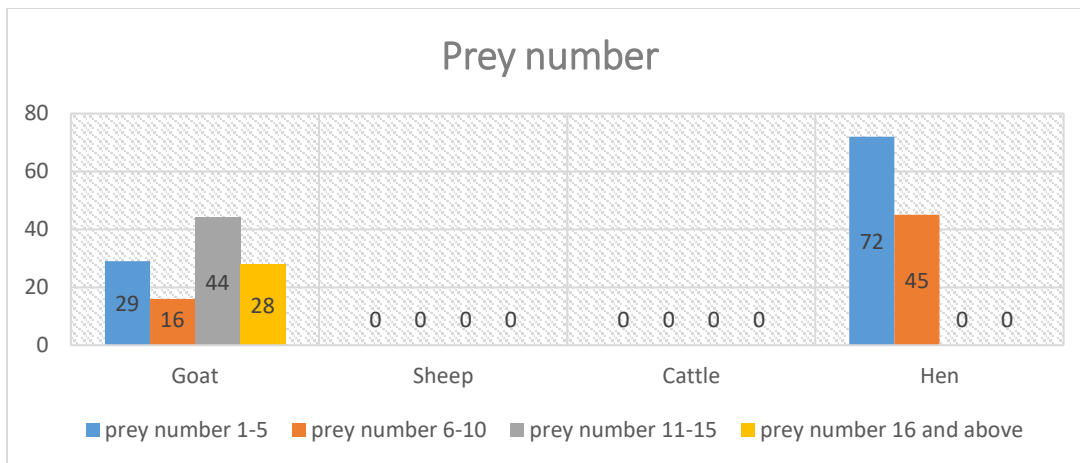

Figure No. 7: Prey type are shown graphically

Figure No. 8: Prey number are shown graphically

4. Discussion

The grey wolf population is making a comeback in countries with a high standard of living because to increased management and conservation efforts. However, retaliatory killings are still taking place in other countries, such as Pakistan, because animals are being stolen from them. The number of individuals belonging to this species is decreasing across the entirety of its range in Pakistan. The location of our research falls within the global geographical range of the species. In order to document the conflict, status, and attitude of the local community towards the species, we sent questionnaires to the residents of the surrounding area. In accordance with

(Kabir et al., 2017) The primary and most significant habitats for grey wolves can be found in the northern parts of the United States. The steep topography of the region, in addition to the fact that there are plenty of grasslands and woodlands in the area, make the northern parts an excellent home for the species. In spite of this, heavily populated communities can be found scattered either inside or very close to the habitat of the grey wolf in these places.(Rodrigues et al., 2006)

According to our research, wolves are more prone to attack smaller and medium-sized animals (such goats and chicks). Goats, which weigh 25 kilogrammes on average, are easier to assault, capture, and kill than cows and other large livestock. Carnivores have a preferred prey size range, and goats and chickens fit inside that range. Summer saw the most predation, followed by spring, fall, and winter. In spring and summer, locals transfer their animals to neighbouring pastures and grazing sites. In most cases, herders will attend to other daily chores while the animals are left unattended. Unattended animals are more prone to be attacked by wolves in this situation. Unattended, unsecured cattle is more likely to be preyed upon, according to global studies. In the winter, people keep their cattle indoors and feed them forest grass. (Mitchell, Hebblewhite, 2013).

Those whose lives have been negatively affected by wildlife tend to dislike predators, according to studies. According to our research, individuals interviewed disliked wolves and wanted to diminish or destroy them. Locals disliked the animal since cattle were their main source of income. Residents believed the wolf to be the most hazardous predator to their livestock. In the study area, wolves were considered as a symbol of barbarism, therefore people feared them more than their harm (Clinchy et al., 2016). The territory was rated as threatening to human life despite there being no recorded wolf attacks throughout the polling period. Because wolves prey on so much sheep, peaceful coexistence between people and wolves is difficult; most herders desired to limit or exterminate their population. (2012)

5. Conclusions and recommendation

According to our investigation and locals' claims, the grey wolf is a common carnivore in the region. The wolf's predation on the town's cattle causes severe economic loss. As a result, they had gloomy views about the species and opposed diminishing or eradicating it. As a consequence

of our investigation and interactions with locals, we've devised conservation methods to protect the grey wolf and limit economic impact. Herds should be compensated for wolf-killed animals. Compensation programmes have successfully changed people's attitudes about animals. Communities should be taught about wildlife's worth and strategies to protect livestock from wolves should be pushed to prevent wolf attacks. Extensive sign and camera trap investigations are also needed to identify the abundance and habitat preferences of local species.

ACKNOWLEDGEMENT:

References

1. Abbas, F., Rooney, T. P., & Mian, A. (2013). Grey wolf in Gilgit-Baltistan, Pakistan: distribution, abundance and persecution. *Canid Biology & Conservation*, *16*(6), 18–24.

2. Berger, J., Stacey, P. B., Bellis, L., & Johnson, M. P. (2001). A mammalian predator-prey imbalance: Grizzly bear and wolf extinction affect avian neotropical migrants. *Ecological Applications*, *11*(4), 947–960. https://doi.org/10.1890/1051-0761(2001)011[0947:AMPPIG]2.0.CO;2

3. Brodie, J., Johnson, H., Mitchell, M., Zager, P., Proffitt, K., Hebblewhite, M., Kauffman, M., Johnson, B., Bissonette, J., Bishop, C., Gude, J., Herbert, J., Hersey, K., Hurley, M., Lukacs, P. M., Mccorquodale, S., Mcintire, E., Nowak, J., Sawyer, H., … White, P. J. (2013). Relative influence of human harvest, carnivores, and weather on adult female elk survival across western North America. *Journal of Applied Ecology*, *50*(2), 295–305. https://doi.org/10.1111/1365-2664.12044

4. Behdarvand, N., Kaboli, M., Ahmadi, M., Nourani, E., Salman Mahini, A., & Asadi Aghbolaghi, M. (2014). Spatial risk model and mitigation implications for wolf-human conflict in a highly modified agroecosystem in western Iran. *Biological Conservation*, *177*, 156–164. https://doi.org/10.1016/j.biocon.2014.06.024

5. Clinchy, M., Zanette, L. Y., Roberts, D., Suraci, J. P., Buesching, C. D., Newman, C., & Macdonald, D. W. (2016). Fear of the human "super predator" far exceeds the fear of large carnivores in a model mesocarnivore. *Behavioral Ecology*, *27*, arw117. https://doi.org/10.1093/beheco/arw117

6. Clucas, B., & Marzluff, J. M. (2013). Coupled Relationships between Humans and other Organisms in Urban Areas. *Urban Ecology*, 135–147. https://doi.org/10.1093/acprof:oso/9780199563562.003.0017

7. Conover, M. (2002). *Resolving Wildlife Conflicts*.

8. Dickman, A. J., Macdonald, E. A., & Macdonald, D. W. (2011). A review of financial instruments to pay for predator conservation and encourage human-carnivore coexistence. *Proceedings of the National Academy of Sciences of the United States of America*, *108*(34), 13937–13944. https://doi.org/10.1073/pnas.1012972108

9. Estes, J. A., Tinker, M. T., Williams, T. M., & Doak, D. F. (1998). Killer whale predation on sea otters linking oceanic and nearshore ecosystems. *Science*, *282*(5388), 473–476. https://doi.org/10.1126/science.282.5388.473

10. *Lituanica*, *13*(1), 34–40. https://doi.org/10.1080/13921657.2003.10512541

11. Hosseini-Zavarei, F., Farhadinia, M. S., Beheshti-Zavareh, M., & Abdoli, A. (2013). Predation by grey wolf on wild ungulates and livestock in central Iran. *Journal of Zoology*, *290*(2), 127–134. https://doi.org/10.1111/jzo.12022

12. Hadidian, J. (2015). Wildlife in U.S. Cities: Managing unwanted animals. *Animals*, *5*(4), 1092–1113. https://doi.org/10.3390/ani5040401

13. Jammu, A., Usman Ali, P., Aziz Minhas, R., Siddique Awan, M., Basharat Ahmed, K., Zaman Qamar, Q., & Iftikhar Dar, N. (2016). Human-Grey Wolf (Canis lupus Linnaeus, 1758) Conflict in Shounther Valley, District Neelum. *Pakistan J. Zool*, *48*(3), 861–868.

14. Janeiro-Otero, A., Newsome, T. M., Van Eeden, L. M., Ripple, W. J., & Dormann, C. F. (2020). Grey wolf (Canis lupus) predation on livestock in relation to prey availability.

Biological Conservation, *243*(December 2019), 108433.
https://doi.org/10.1016/j.biocon.2020.108433

15. Kabir, M., Hameed, S., Ali, H., Bosso, L., Din, J. U., Bischof, R., Redpath, S., & Nawaz, M. A. (2017). *Habitat suitability and movement corridors of grey wolf (Canis lupus) in Northern Pakistan*. 1–17.

16. Khan, T. U., Xiaofeng, L., Ahmad, S., Mannan, A., Khan, W., Khan, A. A., Khan, B. U., Din, E. U., Bhattarai, S., Shah, S., Saeed, S., & Amara, U. (2019). Status and magnitude of grey wolf conflict with pastoral communities in the foothills of the Hindu Kush Region of Pakistan. *Animals*, *9*(10). https://doi.org/10.3390/ani9100787

17. Linnell, J. D. C., Solberg, E. J., Brainerd, S., Liberg, O., Sand, H., Wabakken, P., & Kojola, I. (2003). Is the Fear of Wolves Justified? A Fennoscandian Perspective. *Acta Zoologica*

18. Mishra, C., Mishra, C., Allen, P., Carthy, T. O. M. M. C., & Madhusudan, M. D. (n.d.). *The Role of Incentive Programs in Conserving the Snow Leopard The Role of Incentive Programs in Conserving the Snow Leopard*.

19. Mitchell, M. S., & Hebblewhite, M. (2013). Carnivore habitat ecology: integrating theory

20. Mazur, K. E., & Asah, S. T. (2013). Clarifying standpoints in the gray wolf recovery conflict: Procuring management and policy forethought. *Biological Conservation*, *167*, 79–89. https://doi.org/10.1016/j.biocon.2013.07.017

21. Madden, F. (2004). Creating coexistence between humans and wildlife: Global perspectives on local efforts to address Human–Wildlife conflict. *Human Dimensions of Wildlife*, *9*(4), 247–257. https://doi.org/10.1080/10871200490505675

22. Mishra, C., & Fitzherbert, A. (2004). War and wildlife: A post-conflict assessment of Afghanistan's Wakhan Corridor. *Oryx*, *38*(1), 102–105. https://doi.org/10.1017/S0030605304000158

23. Namgail, T., Fox, Æ. J. L., Veer, Æ. Y., Snow, L. Á., & Wolf, Á. T. Á. (2007). *Carnivore-Caused Livestock Mortality in Trans-Himalaya*. 490–496. https://doi.org/10.1007/s00267-005-0178-2 application. *Carnivore Ecology and Conservation*, 218–255. https://doi.org/10.1093/acprof:oso/9780199558520.003.0010

24. Nyhus, P. J. (2016). Human-Wildlife Conflict and Coexistence. In *Annual Review of Environment and Resources* (Vol. 41). https://doi.org/10.1146/annurev-environ-110615-

085634

25. Peterson, M. N., Birckhead, J. L., Leong, K., Peterson, M. J., & Peterson, T. R. (2010). Rearticulating the myth of human-wildlife conflict. *Conservation Letters*, *3*(2), 74–82. https://doi.org/10.1111/j.1755-263X.2010.00099.

26. Qamar, Q. Z., Ali, U., Minhas, R. A., Dar, N. I., & Anwar, M. (2012). New distribution information on woolly flying squirrel (Eupetaurus cinereus Thomas, 1888) in Neelum Valley of Azad Jammu and Kashmir, Pakistan. *Pakistan Journal of Zoology*, *44*(5), 1333–

27. Rodrigues, A. S. L., Pilgrim, J. D., Lamoreux, J. F., Hoffmann, M., & Brooks, T. M. (2006). The value of the IUCN Red List for conservation. *Trends in Ecology and Evolution*, *21*(2), 71–76. https://doi.org/10.1016/j.tree.2005.10.010

28. Saad, M., Hospital, B., Anwar, M., Waseem, M., Wide, W., For, F., & Salim, M. (2015). *Distribution range and population status of Indian grey wolf (Canis Lupus Pallipes) and Asiatic jackal (Canis aureus) in Lehri Nature Park , District Jhelum , DISTRIBUTION RANGE AND POPULATION STATUS OF INDIAN GREY WOLF (CANIS LUPUS PALLIPES) AND AS*. January.

29. Schaller, G. B. (1975). *Mountain Mammals in Pakistan*

30. Singh, M., & Kumara, H. N. (2006). Distribution, status and conservation of Indian gray wolf (Canis lupus pallipes) in Karnataka, India. *Journal of Zoology*, *270*(1), 164–169. https://doi.org/10.1111/j.1469-7998.2006.00103.x

31. WILSON, D. E., & REEDER, D. M. (2011). Class Mammalia Linnaeus, 1758. In: Zhang, Z.-Q. (Ed.) Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. *Zootaxa*, *3148*(1), 56. https://doi.org/10.11646/zootaxa.3148.1.9