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Illegal Hunting is a Major Threat to Important Wildlife Species of Mangla Dam Freshwater Reservoir

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ABSTRACT: *One of the major cause of biodiversity loss on a global scale is the overexploitation of biological resources. Illegal hunting at Mangla Dam Wetland is the focus of the present investigation, which aims to determine its extent and root causes. Field surveys, primary and secondary data collection, and scheduled meetings with relevant departments, communities, and hunters made up the research. Over a decade, from 2011 to 2020, five different areas of Mangla Dam were monitored for instances of hunting birds, reptiles, and mammals. In 2013, there were 793 recorded cases of hunting, and in 2019 and 2020, there was a dramatic fall in hunting (COVID-19). Pangolins, migratory birds, wild boars, jungle hares, and scorpions were among the most sought-after and illegally hunted animals. During the research, 6416 instances of illegal hunting were documented. In 2013, the hunting index reached its peak of 22 during the past decade. Game hunting, the ease of obtaining firearms (12 bore and repeater), the desire to make money by locals and animal dealers in response to poverty, poor law enforcement, and a general lack of knowledge were the primary drivers of illicit wildlife hunting. This prompted the government to take decisive action in safeguarding animals through the implementation of stringent regulatory frameworks and conservation initiatives.*

Keyword: Illegal Hunting/Killing, Migratory birds, Pangolin, Mangla Dam, Hunting Index

INTRODUCTION

The urgent necessity for a worldwide concerted effort to address the declining world's biodiversity has been highlighted by Lindsey et al. (2020). Loss of habitat and poaching pose major dangers to wildlife in Asian countries (Ullah et al., 2020). When it comes to managing and protecting animal species, studies on wildlife commerce and harm are crucial as said by Prakash et al. 2020. The conservation goals can be attained by the use of wildlife law, among other instruments (Ostrom, 1999). As a result of illegal hunting for game, meat, and trafficking, the populations of many bird and animal species were declining. Hunting wild animals was formerly a common practice in Pakistan. Challenges in protecting biodiversity included inefficient administrative processes, a high illiteracy rate, and a lack of cooperation among relevant government agencies. Poverty and rapid population expansion both contribute to the unsustainable use of natural resources to meet basic human needs, which in turn reduces biodiversity in Pakistan (GOP, 1999). There are currently several statutes in Pakistan that aim to preserve the country's forests, animals, and fisheries. However, reports continue to indicate a rapid decrease in Pakistan's biodiversity. The survival of animals in their native habitats depends on the passage of new legislation and the revision of current ones (GOP, 1999). Illegal hunting, dread, and illicit commerce accounted for the vast majority of wildlife crimes in Pakistan. While reptiles were mostly targeted due to fear, birds were the most common victims of illicit hunting. Yet, according to Haq et al. (2023), all three groups of animals were being negatively impacted by the illicit trade.

Many plant and animal species call wetland areas home. A plethora of rare, endangered, and indigenous species grace their land. Wetlands were crucial to the survival of six fish species, five mammalian species, nine bird species, six reptile species, and seven hundred and twenty-seven fish species in Pakistan (Ali, 2009). The abundance of food and shelter in wetlands makes them ideal habitats for many different kinds of wild animals (Ali and Ripley, 1983). According to Baig and AL-Subaiee, (2011), unlawful hunting and habitat destruction caused a decline in Pakistani wildlife. Basic drivers to disturb the wildlife included things like a growing human population, low incomes, and lax law enforcement.

Many indirect hazards to wildlife were reported near Mangla Dam (Ali et al., 2011). These included the exploitation of the ecosystem for firewood, livestock grazing, and encroachment, which led to habitat deterioration. The inhabitants of Mangla Dam often resort to using fighting or hunting dogs to slaughter animals. Additionally, for amusement, they unlawfully pursued foxes, jackals, and wolves.

Many Asian countries have documented the negative effects of hunting on wetland bird populations, and the current harvest level is unsustainable (Gallo-Cajiao et al., 2020).

In 1967, construction began on the Mangla Dam, which is now the ninth-biggest dam in the world. As a lacustrine (permanent freshwater lake) wetland, Mangla Dam is a type of freshwater wetland (Ali, 2006). Proper management ensures the preservation and protection of wildlife in Bund Khushdil Khan, Haleji Lake, Hub, and Terbella Dams, among other wetlands of a similar type. Despite it is one of the important wintering grounds for migratory birds and habitat ecologically important wildlife.

The present research work has been undertaken to assess the hunting pressure and causes of illegal hunting of important wildlife causes threats to wildlife at the globally important but neglected freshwater reservoir the Mangla Dam.

MATERIALS AND METHODS

Study Site and Duration:

The study was conducted at five pockets of the Mangla dam freshwater reservoir (Fig. 1a), which include Kanshi Pocket (Khadamabad and Siakh), Khad Pocket (Chakswari and Islamghar), Jeri Pocket (Jeri and Kakra), Poonch Pocket (Dadyal and Palak), and Mangla Pocket (Main Dam). The data on illegal hunting was collected for ten years, from 2011 to 2020 (Ali et al., 2011).

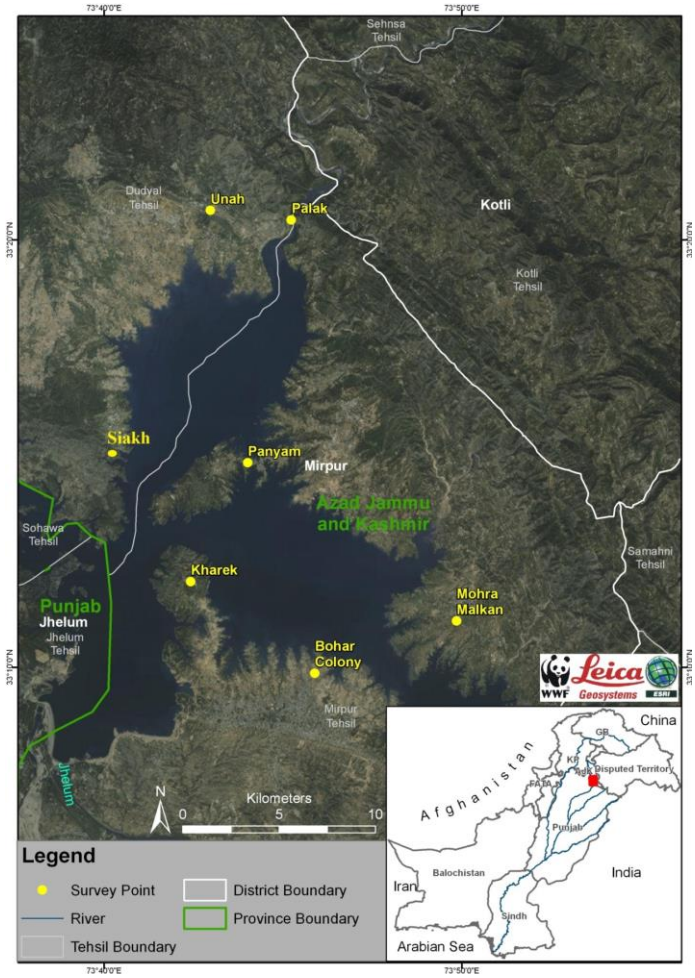


Fig. 1a: Mangla Dam (Credit: WWF-Pakistan)

Data Collection

Direct Observation

The data on illegal hunting and its causes were collected as under:-

Field Surveys

The field surveys of Mangla Dam were conducted for direct observation of hunting at sites with high hunting pressure on proximities of the dam.

Boat survey

The reservoir has been divided into five pockets which were surveyed by motor and paddle boats to measure the wildlife and birds' hunting and threats to their existence.

Night surveys

The nocturnal birds and animals were also killed at night to record hunting at that time night surveys were also conducted.

Indirect Observation

Indirect observations of hunting pressure and illegal trade were collected from the local community, fishermen hunters and concerned government departments through informal meetings with the help of a questionnaire-based study.

Field Guides

Identification of birds and mammals during surveys was carried out by using different field guides and information from experienced field professionals. The field diaries and data sheets were developed to maintain the field record. The field guides by different authors (Roberts, 1991 and 1992 and 1997; Grimmett *et al.*, 1998 and 2008;) were used during surveys.

Hunting index

During the study reports of illegal hunting were also collected from villagers, by personal observations, hunters and the Wildlife & Fisheries Department, AJK. These reports were used to determine the Hunting Index (Ali, 2009) as under:-

$$\text{Hunting Index} = \frac{\text{Hunting incidents reported at Mangla Dam}}{\text{Total Number of Surveys of Mangla Dam}}$$

RESULTS

According to the current study, results are indicating that 20 species of birds, 02 species of reptiles, 04 species of mammals, and 01 species of insect. are victims of hunting. Among 27 animals of different categories, Black partridge*(Melanoperdix niger)* was Vulnerable,Indian Rock Python *(Python molurus)* was Threatened, Pangolin *(Manis crassicaudata)* was Endangered, and the remaining 24 were Least Concern.

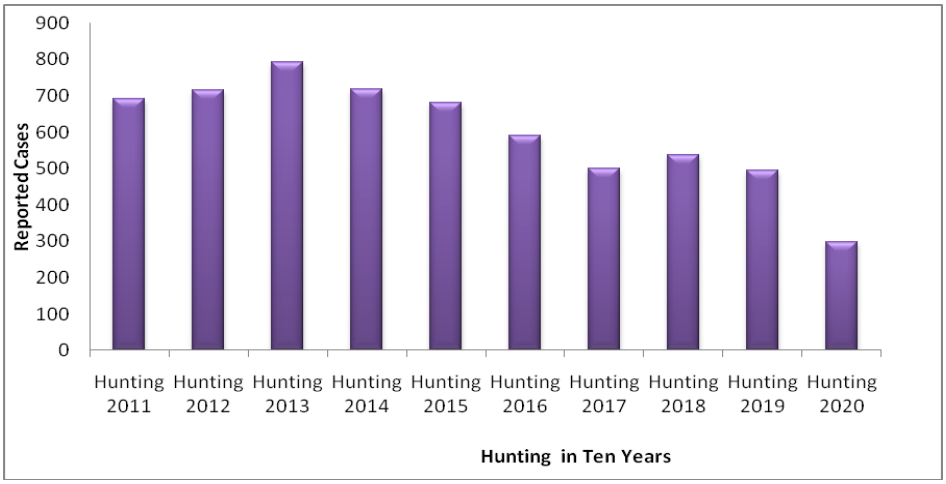


Fig. 1. Reported Illegal Hunting Cases of Wildlife Species from 2011-2020

Department of Wildlife and Fisheries AJK adopted The Punjab Wildlife (Protection, Preservation, Conservation, and Management) Act, 1974 till 2013 for the conservation and protection of wildlife. In 2014, the Department of Wildlife and Fisheries AJK fully opted Azad Jammu and Kashmir Wildlife (Protection, Preservation, Conservation and Management) Act 2014. In fig-1 shows the reported hunting cases of different wildlife species, indicating that the highest hunting report was collected from 2012 to 2014. In 2019 and 2020, the hunting records were 495 and 297, respectively.

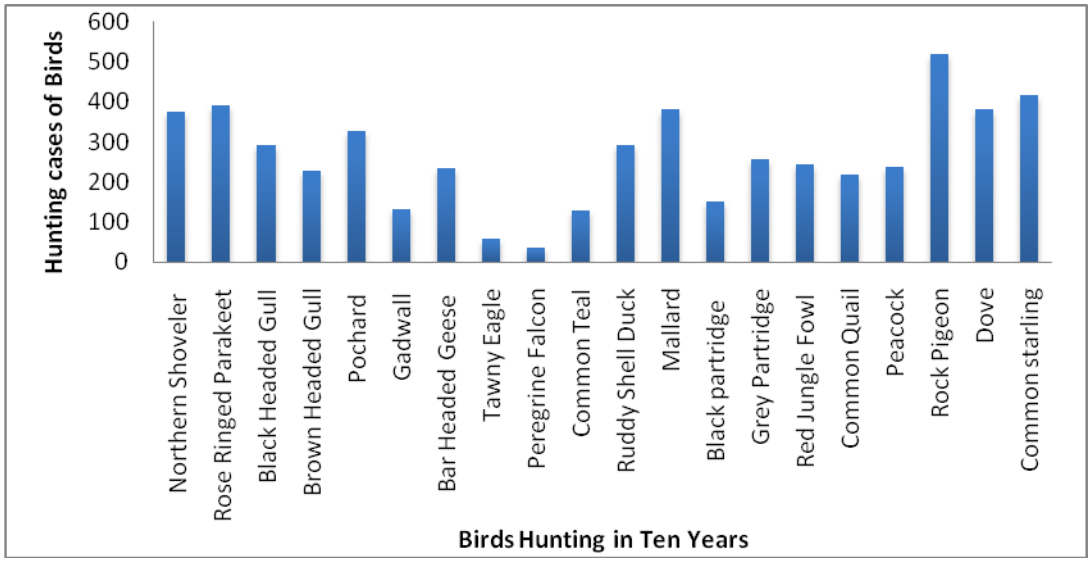
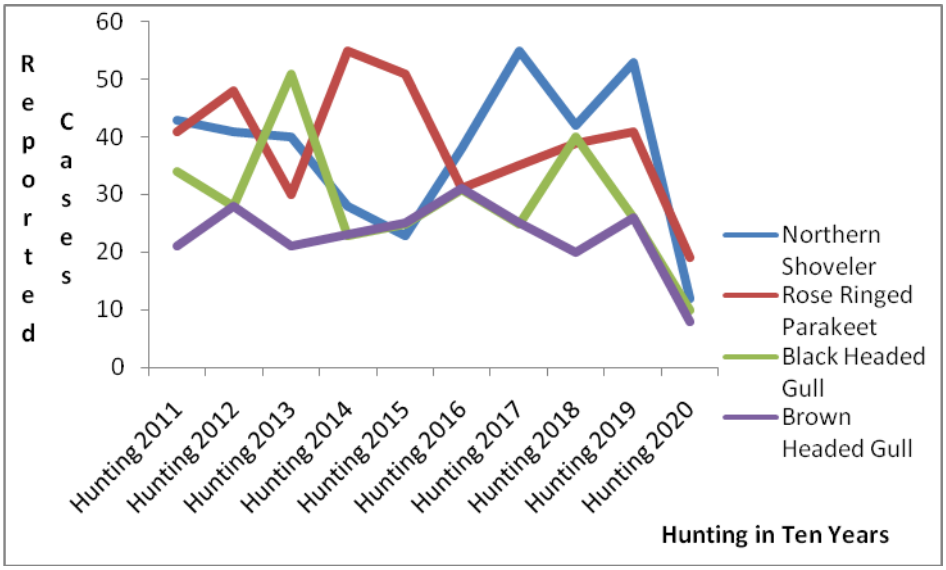
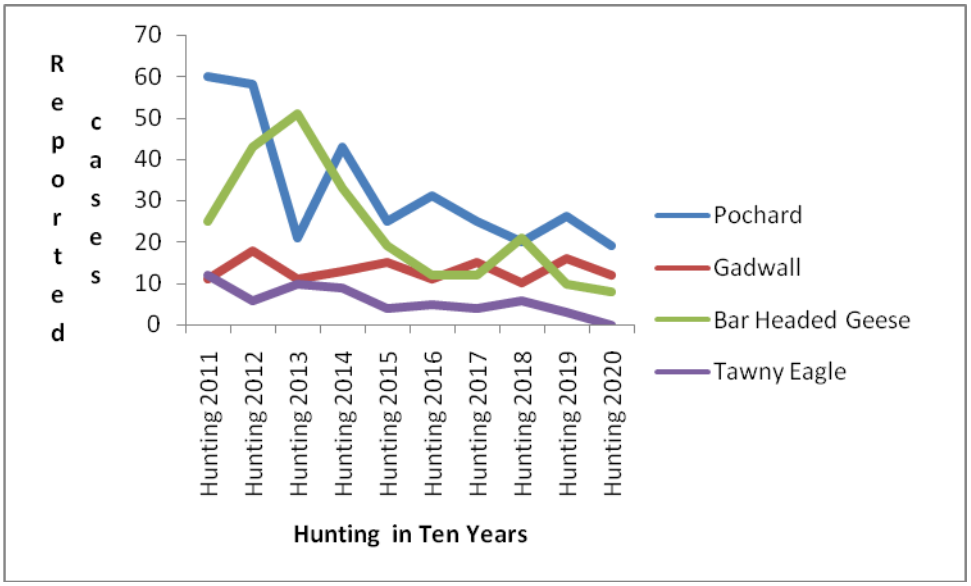


Fig. 2. Birds Illegal Hunting Cases Recorded in the Last Ten Years (2011-2020)

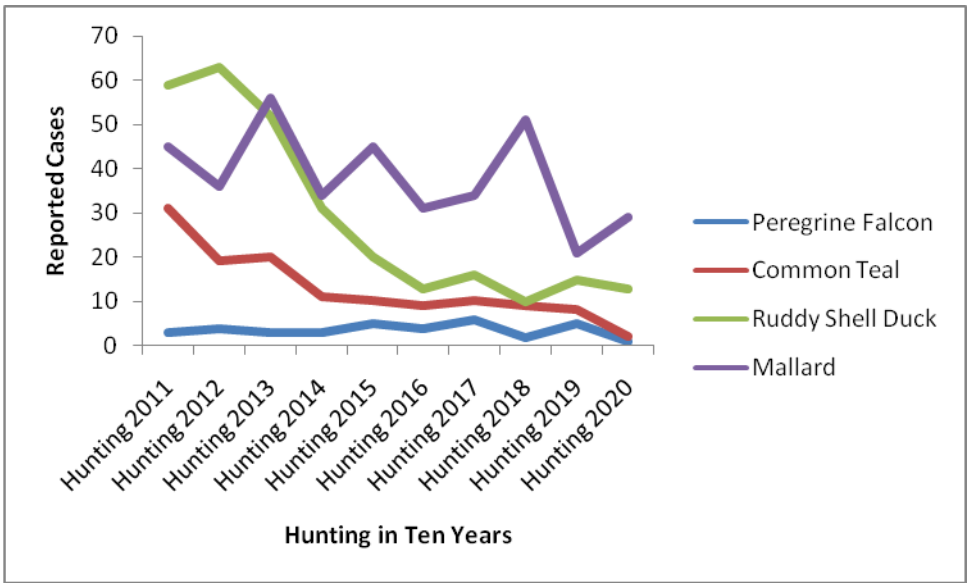
The area around the dam was rich in biodiversity and natural resources. People were involved in illegal wildlife trade and earned millions if they got a chance to sell any most demanding species. They made money by wildlife trapping, trading, and collecting. The most vulnerable hunting species at the dam were migratory birds (Fig. 2).



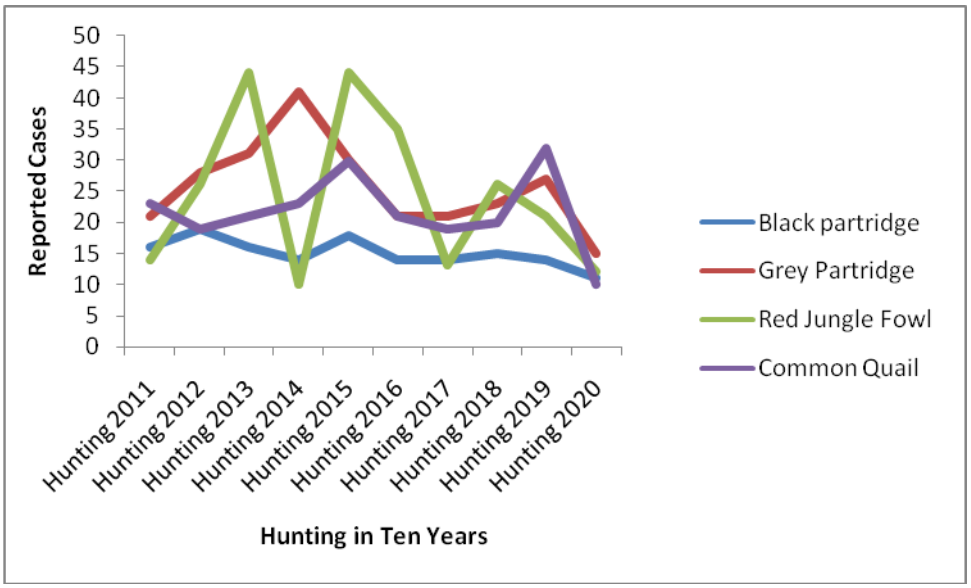
(3A)



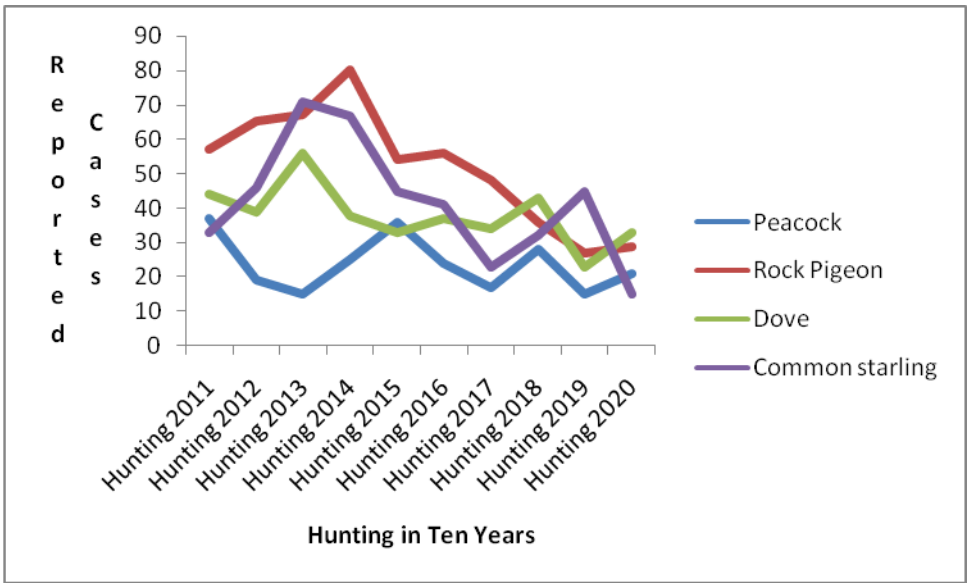
(3B)


70
60
50
40
30
20
10
0
Reported Cases
Hunting 2011
Hunting 2012
Hunting 2013
Hunting 2014
Hunting 2015
Hunting 2016
Hunting 2017
Hunting 2018
Hunting 2019
Hunting 2020
Hunting in Ten Years
Peregrine Falcon
Common Teal
Ruddy Shell Duck
Mallard

(3C)


50
45
40
35
30
25
20
15
10
5
0
Reported Cases
Hunting 2011
Hunting 2012
Hunting 2013
Hunting 2014
Hunting 2015
Hunting 2016
Hunting 2017
Hunting 2018
Hunting 2019
Hunting 2020
Hunting in Ten Years
Black partridge
Grey Partridge
Red Jungle Fowl
Common Quail

(3D)



(3E)

Fig. 3A to 3E. Recorded Illegal Hunting Among Avian Species (2011-2020)

In Fig-3A there is an increase in the hunting of Northern Shoveler (*Spatula clypeata*), Rose Ringed Parakeet (*Psittacula krameri*), Black Headed Gull (*Chroicocephalus ridibundus*), and Brown Headed Gull (*Chroicocephalus brunnicephalus*) was noticed and a decline due to pandemic is also very clear.

According to Fig-3B, the reported cases of illegal hunting of Tawny Eagle (*Aquila rapax*) and Gadwall (*Mareca strepera*) are very few. But hunting of Pochard (Aythya ferina) and Bar Headed Geese (*Anser indicus*) was significantly high during 2011-2014 and also declined in 2019-2020 (COVID-19).

The hunting of Common Teal (*Anas crecca*), Ruddy Shell Duck (Tadorna ferruginea), and Mallard (Anas platyrhynchos) was high from 2011 to 2013. While illegal hunting of Peregrine Falcon (*Falco peregrinus*) was recorded less within 10 years (Fig-3C)

Black partridge (*Melanoperdix niger*) hunting cases were less as compared to Grey Partridge (*Perdix perdix*), Red Jungle Fowl (*Gallus gallus*), and Common Quail (*Coturnix coturnix*) because of their high demand in restaurants (Fig-3D).

The Indian Peacock (*Pavo Cristatus*) trapping was less observed, while the Rock Pigeon (*Columba livia*) Eurasian collared dove (*Streptopelia decaocto)*, and Common starling (*Sturnus vulgaris*)

were hunted and trapped at a significant level during 2011-2013 (Fig-3E)

During the study, the hunting among 20 species of birds was recorded. The migratory birds were hunted at most like Bar Headed Geese (234), Northern Shoveler (375), Pochard (328), Ruddy Shell Duck (292), Common Teal (129), and Mallard (382) Among other birds species Rock Pigeon (519), Common Starling (418) Black partridge (151) and Grey Partridge (258), Eurasian Collared Dove **(**380), and Common Quail (218) (Fig: A-E).

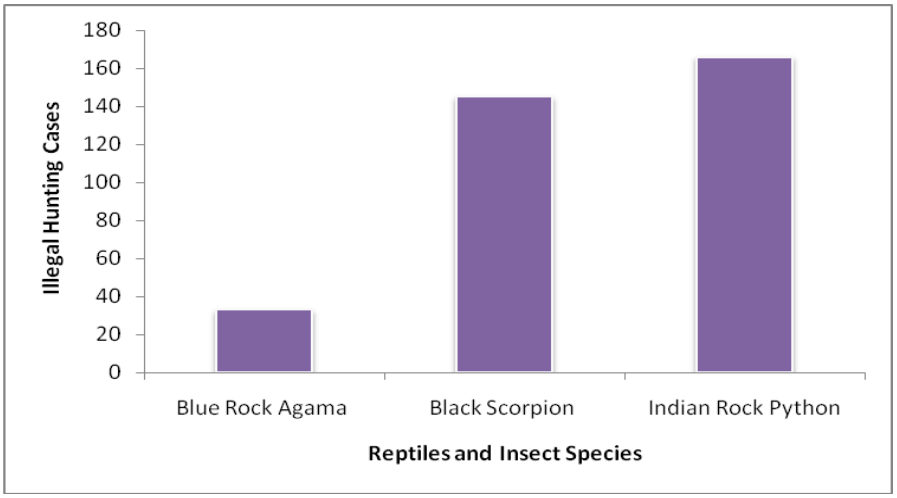


Fig. 4. Illegal Hunting Case of Reptiles and Insect (2011-2020)

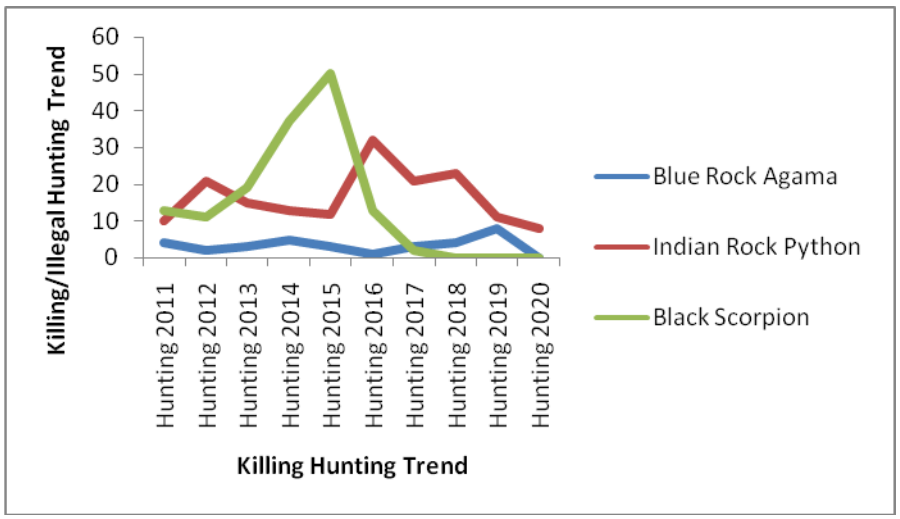


Fig. 5. Trend of Killing and Illegal Hunting (2011-2020)

As per the illegal hunting/killing cases in reptiles, two species were of great concern Blue Rock Agama (*Laudakia tuberculata*) and Indian Rock Python

(*Python molurus*). The *Python molurus* is Threatened and facing great pressure of hunting and killing. Among Insects Black Scorpion (*Androctonus bicolour*) was of great importance in illegal trade. The cases of illegal hunting of Blue Rock Agama were less but killing/illegal hunting of Indian Rock Python was very high during ten years of study. The population of Black Scorpions fell victim to illegal hunting/trade from 2012 to 2017 due to the high demand for its venom in cancer treatment (Fig-4&5).

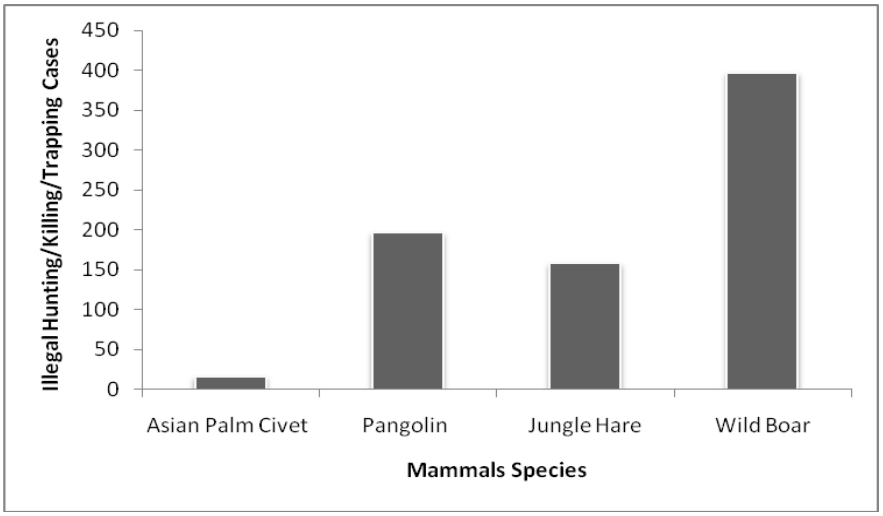


Fig. 6. Illegal Hunting/Killing/Trapping Cases of Mammal (2011-2020)

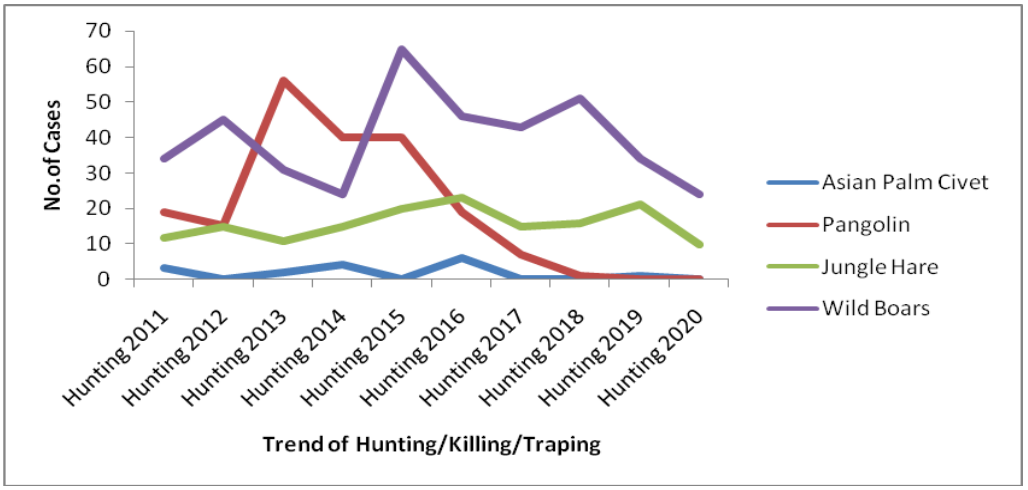


Fig. 7. Trend of Hunting/Killing/Traping (2011-2020)

The cases of illegal hunting/trapping/killing trapping of 04 mammal species were recorded (figures 6 and 7). The Wild Boar (*Sus scrofa*)

and Pangolin (*Manis crassicaudata*) were the main victims of these illegal activities. The Wild boars were killed/hunted due to dislikeness or for game hunting the trend lines indicate that it was on a continuous scale a small decline was observed in 2019-2020 (Pandemic). The other important mammal that was trapped or killed on a large scale was Pangolin. In 2011 and 2012, the cases were very low, but a great intensity of illegal activities was noticed from 2013 to 2016. The Pangolin is an endangered animal. Its declining population altered the conservation department, and the rate of illegal hunting and trapping was controlled from 2016 to onward due strict protection and conservation. The others suffering from illegal activities of hunting and killing were the least concerned Asian Palm Civet (*Paradoxurus hermaphroditus*) and Jungle Hare (*Lepus nigricollis*).

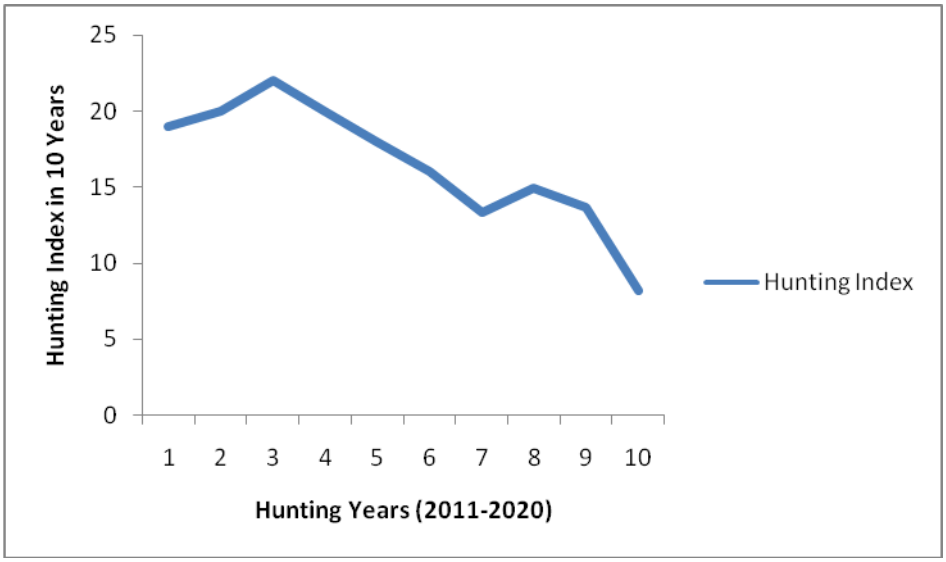


Fig. 8: Hunting Index (2011-2020)

Figure 8 indicates the trendline of the hunting index. The highest Hunting Index was recorded in 2013 (22) and it gradually declined to 13.3 in 2017. During 2020 the lowest hunting index was recorded which was 8.2.

DISCUSSION

Hunting licenses were issued by the Wildlife and Fisheries Department of AJK for Rs. 1500 per year until 2013. Following that, the practice was outlawed. This hunting prohibition can explain why there has been a drop in hunting-related incidents since 2015.

The loss of biodiversity is significantly accelerated by hunting, as stated by Benítez-López et al., 2017. In addition, the pandemic is also a reason for the decline in hunting-related reports in 2019 and 2020. The pandemic lockdown has positively affected the wildlife population, as fewer human activities have occurred in vital areas. Similarly, Behera et al., 2022 reported the same thing.

Primarily for subsistence and to supplement their income by trading, collecting, and trapping wildlife, the local community engaged in illegal hunting. The migrating birds were the most vulnerable species to shooting at the dam. The local animal dealers gained 5,000 to 10,000 rupees for a single bar-headed geese (*Anser indicus*). Even though many locals had nothing to do with it, they did mark the spot for hunters and help in hunting. They managed to capture a wide variety of birds, including Peafowl (*Pavo cristatus*), Rock Pigeon (*Columba livia*), Francolin (*Francolinus pondicerianus*), Common Quail (*Coturnix coturnix*), Rose Ringed Parakeets (*Psittacula krameri*), and Asian Palm Civet (Paradoxurus hermaphrodites). While there, hunters also sought out Common Quail (*Coturnix coturnix*), Grey Francolin (*Francolinus pondicerianus*), and Rose Ringed Parakeets (*Psittacula krameri*). For as little as Rs.1500 to Rs.5,000, the trapper would sell as many as 30–50 birds in each trap to people interested in animals or on the animal market. Ramachandran et al., 2017 state that illicit bird killing and hunting severely threaten bird conservation efforts worldwide. Unsustainable bird hunting in wetland habitats, particularly along important flyways, has contributed to avifauna defaunation and species endangerment. Since wetlands are primary habitats for migratory birds and are associated with anthropogenic landscapes, a comprehensive understanding of bird harvesting and its drivers is fundamental to reducing threats to current avifauna.

A possible decrease in the Common Starling population may have resulted from the study site's record-high number of hunting incidents (418). According to Mahmood et al. (2013), the Common Starling population has dropped dramatically during the last 6-8 years. Since starling meat dishes are promoted through local restaurants, this decline could be caused by unregulated hunting for commercial reasons. One of the greatest dangers to Common Starling populations in Pakistan during the winter is the unregulated and illegal shooting of the birds. Wildlife

regulations must be strictly enforced. The impact of fungicides and pesticides on Common Starling populations in their wintering grounds requires additional in-depth research.

As mentioned earlier, illegal hunting and trapping of wild animals was normal at the Mangla Dam and its periphery. While certain animals were targeted year-round, others were targeted seasonally based on their location within the property. In the Northern Section of Bardia National Park, Nepal, hunters utilized various tools and methods, including traps, cages, hunting dogs, motor/paddle boats, rifles, and weaponry (Repeater and 12 Bore guns). This practice was documented by Bhattarai et al. (2017) as well. For hunting and trapping, they also used the recorded sounds of birds and parrots and utilized various models of mimicking species of birds and animals. From Mangla Dam and the surrounding forest, migratory birds were the most sought-after wintertime prey. Basudine and carbo-furan granules were used to poison grazing waterfowl, including Ruddy Shell Ducks, Wigeons, and Bar-headed Geese. The diving ducks belong to Family Anatidae e.g. Red-crested pochard and common pochard were entangled and died in fishing nets. The accused were fined after court procedures e.g. Rs.5000 for Rose Ringed Parakeet, Rs.10,000 per bird for Bar Headed Geese, and Rs.10000 per bird for Tawny Eagle. However, after heavy fines were imposed, illegal hunting was not under control, and stricter legislation was demanded. The Datta, 2022 also found Illegal wildlife hunting, especially birds, is a primary global conservation concern for many dwindling species in Bangladesh.

Pythons and other snake species decline because people are naturally terrified of them. Snake charmers poaching snakes for their meat and venom, which they then use in various medicinal preparations, contribute to the declining population of snakes. Additionally, the disappearance of the python's natural habitat due to tree cutting for timber and firewood was a significant threat to this nonpoisonous snake. During the study, 11 killed snakes were found along the tracks of the dam, in forest trails, and in human dwellings. A total of 6 dead and live pythons were brought to the Office of Wildlife and Fisheries, AJK, that were captured from human dwellings and cattle yards. Haering (2015) claims that many members of society encounter animals regularly. Occasionally, these interactions are pleasant and provide numerous opportunities to enjoy and appreciate natural resources. But

sometimes, these connections between the community and wildlife are unpleasant and may cause severe conflict, which causes hazards to human lives or assets and creates financial hardship. The community also expects that the concerned department should offer quick solutions to these issues but in the present case, the AJK wildlife department was not in this position to address the community wildlife conflicts due to a shortage of trained field staff, funds, and poor implementation of the Wildlife Protection Act. The community also expects the relevant department to solve these issues promptly. Mangla Dam was also the site of unlawful hunting and trapping of the black scorpion, which had a reputation for healing cancer (Christensen, 2014; Gutman, 2013; Iacurci, 2015). The AJK Wildlife Department asserted in 2014 that they confiscated approximately 6 kg of black scorpions from Dadyal, which were involved in the unlawful trade. Under the law, the department fined hunters and merchants between Rs.10000 and Rs. 15000 for each black scorpion and 1500 rupees for each blue rock agama.

The location was mentioned as a location of extensive hunting for wild boar (*Sus scrofa*) and jungle hare (*Lepus nigricollis*). Deceased Asian Palm Civets (*Lepus capensis*) were discovered on the roadside due to road kill. But it was the Indian pangolin that was in danger; it was on the IUCN Red List for 2014 as an endangered species (Baillie et al., 2014). The pangolin species was downgraded from lesser risk/near threatened in 1996 to near threatened in 2008. There were 197 reports of pangolin poaching reported to the AJK Department of Wildlife and Fisheries between 2011 and 2020. The illegal trade of Indian pangolins, primarily for their meat and scales, posed the greatest threat to these animals. Many Vietnamese and Chinese dishes make use of their meat. The scales were found to be used in pharmaceuticals and protective vests. Even though it is banned by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), its illicit trafficking continues. In Dadyal, Dadyal, Barnala, and Mirpur, there were numerous reports of hunting. According to Waseem et al. (2020), a single pangolin might get the poacher Rs. 80,000/- in no time. This way, they can become filthy rich in a day with just one trap. The relevant department did what it could to save this endangered species, but it will be a while before their efforts bear fruit. Despite declining hunting incidents in 2016, the goal of

achieving zero hunting still needed to be met. The trappers used trained sniffer dogs to track pangolins, making the hunting process incredibly easy. When threatened, pangolins would roll up into a ball, which the poachers would pluck and put in bags. Poachers who didn't have access to sniffer dogs would use pills with a solid odour to make the pangolin roll up. A pound of its meat sells for 600 USD on the global market. To protect the critically essential creature for the environment, the Department of Wildlife and Fisheries fined the perpetrators between Rs. 10,000 and Rs.15,000 Indian rupees for each pangolin.

The wild hares and boars were hunted throughout the year (Fig. 6 and 7) from jungle cover. Throughout the year, Indian pangolins, originating from sandy soil/grassland/cultivation land, seek refuge in areas with trees and plants. Various things were made from the animals that were hunted or captured; for example, feathers from birds were used for making clothes, decorations, and even medications. Many things were made from pangolins, including medications, protective coats, and food. In the summer, the snakes were plucked from the rocks, woods, and plants surrounding the dam. Treating medical conditions with snake and black scorpion venom was common practice. The natives also utilized other animal parts for black magic, such as snake skin, pangolin scales, red fox hair, and barking deer hoofs. To generate revenue, the local community and fisherman would advise hunters on the best times and places to go hunting in the area. The natives would often spend a few days hunting or assisting the hunters, but they would spend weeks or even months if the work or deal were vital.

Mangla Dam was the site of multiple animal hazards. Several factors contribute to water pollution in dams, including farmers' pesticide use, which significantly impacts insectivorous birds, and oil leaks from diesel pumps used to collect water. Wildlife, including fish and birds, faces threats from agricultural runoff. Heavy metal emissions from the dam could be caused by rock weathering in the Pir Panjal Range and the River Jhelum catchments. Silt builds up in the river due to deforestation, which degrades habitats. One of the leading causes of the dwindling wildlife populations in AJK was the increase in hunting and trapping. A fig. 8 showed that the hunting index of sites reached 22, indicating a substantial level of hunting pressure. Illegal bird hunting using nets,

traps, and toxic substances is common in migratory and watery regions, according to Htay et al. (2023).

The availability of firearms and ammunition, a lack of education and entertainment options, poverty, hunting by the well-off, and a failure to adequately enforce the Wildlife Protection Law were the primary causes. Finally, we suggest to spread the word among the general population and school-aged children. More people will be aware of the needs of wildlife, and the services they give to ecosystems, as a result, hunting will be reduced in intensity. Finally, when these suggested conservation conditions are met, the Mangla Dam Freshwater Reservoir conservation efforts aimed at reducing wildlife hunting pressures will be effective. Furthermore, in the present conditions, wildlife conservation requires immense efforts in legislation, political initiatives, public awareness, goal prediction, moral and ethical considerations, and most momentously, partnerships between governmental and non-governmental organizations.

CONCLUSION

The results show that there is a lot of illegal hunting, trapping, and killing of wildlife in the Mangla Dam Freshwater Reservoir and that places with a lot of hunting pressure should be the ones where conservation efforts are concentrated. One pertinent strategy is concentrating enforcement patrols in dam regions since hunting is more prevalent in nearby parts of Mangla Pockets and the surrounding forest. The local community, farmers, and fishers should be the focus of future conservation efforts aimed at reducing these recorded hunting pressures. There are a lot of other factors that contribute to wildlife killings, including negative interactions between humans and wildlife (such as crop damage), poverty, ignorance, an inadequate workforce, outdated or nonexistent transportation, and lax enforcement of the law. A local population should be provided with alternative sources of income because making a quick buck from illegal hunting is crucial. Because Mangal Dam is home to numerous endangered species and a crucial resting place for migrating birds where the Indus Flyway crosses, the current Department of Wildlife and Fisheries in AJK needs to be bolstered, and new legislation passed to end the illegal killing of wildlife there.

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CONFLICT OF INTEREST

No conflicts of interest were reported by the authors.

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