

Illegal hunting in Jordan: using social media to assess impacts on wildlife

E H A B E I D and R A M Z I H A N D A L

Abstract This study is the first to provide data on the extent of illegal hunting practices in Jordan using posts on social media. During January 2015–January 2016 photographs from seven hunter groups on Facebook recorded the killing of 4,707 native animals of 59 species, of which birds constituted the majority, followed by mammals and reptiles. Flouting of Jordanian laws was widespread, with daily bag limits exceeded on many occasions, and in the case of chukar partridge *Alectoris chukar*, the most popular quarry, some hunters exceeded the limit by 3,000%. Of even greater concern, a total of 34 species with special protection under Jordanian law were killed, and the hunting of large mammals, especially ibex *Capra nubiana* and gazelles (*Gazella* spp.), with already depleted populations, was particularly excessive. It also appeared that a significant number of gazelles were shot by unlicensed hunters from Arabian Gulf countries. Overall, the survey indicates an alarming picture of overhunting of threatened species and ineffective enforcement of hunting laws, despite the efforts of key government and voluntary agencies. We recommend urgent action to address the causes of the problem and to improve the management of hunting through better collaboration, mobilization of resources and awareness raising.

Keywords Facebook, hunting, illegal, impact, Jordan, social media, wildlife

Introduction

The Government of Jordan recognized the importance of regulating hunting as early as 1934, when the first hunting law was issued by the Ministry of Agriculture. Since then, this law has been revised and amended to meet changing needs, and several institutions have been established to manage and regulate hunting. In 1956 the concept of game species was first introduced and in 1966 regulations on guns used for hunting were issued. In the same year, the Royal Jordanian Hunting Club was reborn as the Royal Society for the Conservation of Nature (Fitter, 1967) and given a de facto role in hunting control. At the time, all hunting

and shooting was forbidden without a license (which cost JOD 5 per year) and hunting seasons and bag limits for all game species were set by the Royal Society for the Conservation of Nature committee (Fitter, 1967). In addition, the use of automatic weapons, nets and traps, and mechanical vehicles and spotlights for hunting were prohibited. In 1973 the government amended the Agricultural Law to incorporate a Wildlife Conservation Law and delegated the Royal Society to implement this (Amr et al., 2004). Under this Law the Royal Society's previous de facto role in hunting control became official and it was given authority to issue and administer hunting licences and impose fines for non-compliance with the hunting laws.

The Royal Department for Environmental Protection was established in 2006 to improve the quality of Jordan's environment through proper and effective enforcement of environmental legislation, enhancing cooperation with and between relevant authorities, and increasing national support and advocacy for environmental issues. Since its establishment, the agency has worked cooperatively with the Royal Society for the Conservation of Nature and has had some success in preventing violations against wildlife, with a total of 354 hunting violations registered and handled during 2009–2014 (Ministry of Environment, 2016). In 2014 the Jordan Outdoor Sport Association was created as a non-profit hunters' association, to spread awareness amongst hunters and other stakeholders about sustainable hunting in Jordan. Since its establishment the Association has carried out release programmes in wilderness areas for two popular game species, chukar partridge *Alectoris chukar* and sand partridge *Ammoperdix heyi*. These are intended to supplement existing wild populations and meet hunters' needs more sustainably (R. Handal, pers. obs.).

Currently, hunting is covered by three laws: Agricultural Law No. 13 (2015), the Aqaba Region Authority Law No. 32 (2000), and the Law of Environmental Protection No. 1 (2003) (Amr et al., 2004). These laws have a wide range of clauses for protecting wild animals, including hunting regulations, for ensuring cooperation between non-governmental and governmental agencies, and for assigning responsibilities for enforcement and the distribution of available funds among agencies. There are also articles defining the level of penalties for violations of these laws, based on detailed appendices in regulation No. 34 (2003) of the Agriculture Law. Hunting of species on Appendix I is punishable by imprisonment for 4 months and a fine of JOD 1,000, on Appendix II by imprisonment for 3 months

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and a fine of JOD 1,000, and on Appendix III by imprisonment for 1 month and a fine of JOD 100 (FAOLEX, 2015).

Although hunting is a socially acceptable practice in Jordan (at least for the majority), there is concern about increasing illegal hunting and its impact on individual species. Prominent hunters have estimated the number of unlicensed hunters to be 5,000–10,000 (RSCN, 2005; R. Handal, pers. obs., 2015) but the number could be up to c. 16,000 (i.e. four times the number of licensed hunters; RSCN, 2005). There are, however, few data on the scale of illegal hunting and its effect on game and other species. We therefore attempt here to establish the extent of the problem and to discuss the conservation implications for globally threatened species and species protected by Jordanian law. Illegal hunting in Jordan is poorly documented by the responsible authorities because of problems with species identification, and we therefore used the visibility of hunting on social media to obtain data on the number and species hunted.

Methods

Daily investigations of seven hunting groups active on Facebook were carried out during January 2015–January 2016 (13 months). These groups were accessible to anybody following a join request. We did not visit the personal pages of hunters, collect any personal information or interact with the people posting photographs. Only photographs uploaded to the groups' pages were collected, and stored on an encrypted drive. All posts with photographs of hunted species were downloaded within a day of being posted. A total of 1,251 photographs were downloaded and screened to remove duplicates and any in which there was uncertainty about the source and/or the species killed. Such uncertainties became evident from an examination of vehicle numbers present in the photographs, from comments that appeared with each photograph, and/or from images of the hunters. After duplicates and photographs with other anomalies (such as a low resolution) were omitted, a total of 606 photographs remained. These were examined in detail to determine the species hunted and the number of each species killed.

Results

In the 606 photographs a total of 4,707 individuals of 59 species were hunted in the wild over the study period. The majority were birds ($n = 3,920$, 84%), followed by mammals (785, 16%) and reptiles (2, < 1%; Table 1). Five species of mammals categorized as Vulnerable on the IUCN Red List (IUCN, 2016) were recorded (Nubian ibex *Capra nubiana*, goitered gazelle *Gazella subgutturosa*, dorcas gazelle *Gazella dorcas*, mountain gazelle *Gazella gazella*, marbled

polecat *Vormela peregusna*), along with two Vulnerable bird species (Asian houbara *Chlamydotis macqueenii*, turtle dove *Streptopelia turtur*), two Endangered bird species (saker falcon *Falco cherrug*, steppe eagle *Aquila nipalensis*), and a Vulnerable reptile species (Egyptian spiny-tailed lizard *Uromastyx aegyptia*).

The chukar partridge was the most hunted species, with a total of 1,503 kills recorded, followed by the common quail *Coturnix coturnix* (849) and the rock dove *Columba livia* (632). The cape hare *Lepus capensis* was the most commonly hunted species of mammal, with a total of 438 kills, followed by the Nubian ibex (115) and wild boar *Sus scrofa* (40).

Of the 59 species killed by hunters, 36 are protected under Jordanian law and were therefore hunted illegally. These include nine species listed in Appendix I of Agriculture Law No. 13 (7 mammals and 2 birds), 15 species on Appendix II (7 mammals and 8 birds) and 12 species on Appendix III (1 mammal, 1 reptile and 10 birds).

Many hunters also appear to be flouting the regulations on bag limits. These limits specify the number of kills allowed for a given species in a single day or period by a single hunter; these are announced annually by the Ministry of Agriculture following recommendations provided by the Wildlife Committee. Table 2 provides a comparison of the legal bag limits over the study period for four bird species that can be legally hunted with the maximum number of kills revealed in single photographs posted by hunters on Facebook. Assuming that the number of hunters that appear in each photograph (including the photographer) represent all the hunters involved in the display of kills, and that all the birds in each photograph were killed on the same day, then bag limits for these species were considerably exceeded. In the case of the chukar and sand partridges, for example, the bag limits on the days the photographs were taken were exceeded by > 3,000 and > 1,000%, respectively.

Discussion

High species diversity in Jordan is a result of its location at the junction of the African, Oriental and Palaearctic faunal regions (Amr et al., 2004). The Kingdom is known to support 83 species of mammals (Amr, 2012), 406 species of birds (Eid & Qaneer, 2013), and 103 species of reptiles and amphibians (Disi et al., 2014). Threats to species in Jordan have increased since the beginning of the 20th century, when machine guns and vehicles for hunting were first introduced (Qumsiyeh et al., 1996). This, together with growth of the human population, habitat loss and the growing popularity of hunting amongst urban populations, has caused the extinction of the Arabian oryx *Oryx leucoryx* (Nelson, 1973; Fitter, 1984; Lamb, 1984; Hatough & Al-Eisawi, 1987; Qumsiyeh, 1996), roe deer *Capreolus capreolus* (Eid & Ananbeh, 2009), and the Arabian leopard

TABLE 1 Animal species and numbers hunted in Jordan during January 2015–January 2016, as recorded from photographs posted on Facebook by hunters' groups, with their protected status in Jordan (according to the Ministry of Agriculture), category on the IUCN Red List (2016), range of hunting bag size in photographs, total number killed, and whether species can be legally hunted.

Species	Protected status in Jordan	IUCN Red List status*	Range of number killed	Total number killed	Legally hunted?
Class Mammalia, Order Artiodactyla					
Family Suidae					
Wild boar <i>Sus scrofa</i>		LC	1–5	40	Yes
Family Bovidae					
Nubian ibex <i>Capra nubiana</i>	Appendix I	VU	1–5	115	No
Dorcas gazelle <i>Gazella dorcas</i>	Appendix I	VU	1	2	No
Mountain gazelle <i>Gazella gazella</i>	Appendix I	VU	1	1	No
Goitered gazelle <i>Gazella subgutturosa</i>	Appendix I	VU	1–10	23	No
Family Canidae					
Golden jackal <i>Canis aureus</i>	Appendix I	LC	1–2	3	No
Wolf <i>Canis lupus</i>	Appendix I	LC	1	1	No
Red fox <i>Vulpes vulpes</i>		LC	1–3	18	No
Family Felidae					
Caracal <i>Caracal caracal</i>	Appendix I	LC	1	1	No
Family Herpestidae					
Egyptian mongoose <i>Herpestes ichneumon</i>	Appendix II	LC	1	1	No
Family Hyaenidae					
Striped hyaena <i>Hyaena hyaena</i>	Appendix II	NT	1	27	No
Family Hystricidae					
Indian crested porcupine <i>Hystrix indica</i>	Appendix II	LC	1–2	32	No
Family Leporidae					
Cape hare <i>Lepus capensis</i>	Appendix III	LC	1–28	438	No
Family Mustelidae					
Stone marten <i>Martes foina</i>	Appendix II	LC	1	1	No
European badger <i>Meles meles</i>	Appendix II	LC	1–2	30	No
Marbled polecat <i>Vormela peregusna</i>	Appendix II	LC	1	2	No
Family Procaviidae					
Rock hyrax <i>Procavia capensis</i>	Appendix II	LC	1–8	37	No
Class Reptilia					
Family Agamidae					
Egyptian spiny-tailed lizard <i>Uromastyx aegyptia</i>	Appendix III	VU	1	2	No
Class Aves					
Family Accipitridae					
Eurasian sparrowhawk <i>Accipiter nisus</i>	Appendix II	LC	1	1	No
Steppe eagle <i>Aquila nipalensis</i>	Appendix II	EN	1	1	No
Steppe buzzard <i>Buteo buteo</i>	Appendix II	LC	1	2	No
Long-legged buzzard <i>Buteo rufinus</i>	Appendix II	LC	1	2	No
Western marsh harrier <i>Circus aeruginosus</i>	Appendix II	LC	1	1	No
Black-winged kite <i>Elanus caeruleus</i>		LC	1	1	No
Family Anatidae					
Northern pintail <i>Anas acuta</i>		LC	1	1	No
Northern shoveler <i>Anas clypeata</i>		LC	1–4	9	No
Blue-winged teal <i>Anas discors</i>		LC	1–12	35	No
Mallard <i>Anas platyrhynchos</i>		LC	1–3	8	No
Garganey <i>Anas querquedula</i>		LC	1–4	6	No
Family Ardeidae					
Purple heron <i>Ardea purpurea</i>	Appendix III	LC	1	2	No
Family Burhinidae					
Eurasian stone curlew <i>Burhinus oedicnemus</i>	Appendix III	LC	1–3	6	No
Family Caprimulgidae					
Nightjar <i>Caprimulgus europaeus</i>	Appendix III	LC	1	1	No
Family Cerylidae					
Pied kingfisher <i>Ceryle rudis</i>	Appendix III	LC	1	1	No

Table 1 (Cont.)

Species	Protected status in Jordan	IUCN Red List status*	Range of number killed	Total number killed	Legally hunted?
Family Charadriidae					
Spur-winged plover <i>Vanellus spinosus</i>		LC	1–2	3	No
Family Ciconiidae					
White stork <i>Ciconia ciconia</i>	Appendix III	LC	1–2	4	No
Black stork <i>Ciconia nigra</i>	Appendix III	LC	1	1	No
Family Columbidae					
Rock dove <i>Columba livia</i>		LC	1–67	632	Yes
Laughing dove <i>Spilopelia senegalensis</i>		LC	1–86	390	No
Collared dove <i>Streptopelia decaocto</i>		LC	3–92	209	Yes
Turtle dove <i>Streptopelia turtur</i>		VU	5–21	72	Yes
Family Corvidae					
Eurasian jay <i>Garrulus glandarius</i>		LC	1	1	No
Family Falconidae					
Saker falcon <i>Falco cherrug</i>	Appendix I	EN	1	1	No
Common kestrel <i>Falco tinnunculus</i>	Appendix II	LC	1	2	No
Family Glareolidae					
Cream-coloured courser <i>Cursorius cursor</i>	Appendix III	LC	1–2	3	No
Family Gruidae					
Common crane <i>Grus grus</i>	Appendix III	LC	1–6	30	No
Family Otididae					
Houbara bustard <i>Chlamydotis undulata</i>	Appendix I	VU	1	1	No
Family Phasianidae					
Chukar partridge <i>Alectoris chukar</i>		LC	1–76	1503	Yes
Sand partridge <i>Ammoperdix heyi</i>		LC	3–24	39	Yes
Common quail <i>Coturnix coturnix</i>		LC	1–80	849	Yes
Black francolin <i>Francolinus francolinus</i>	Appendix III	LC	1–15	34	No
Family Pteroclididae					
Pin-tailed sandgrouse <i>Pterocles alchata</i>		LC	56	56	No
Family Rallidae					
Eurasian coot <i>Fulica atra</i>		LC	1	1	Yes
Water rail <i>Rallus aquaticus</i>	Appendix III	LC	1	1	No
Family Recurvirostridae					
Black-winged stilt <i>Himantopus himantopus</i>		LC	1	1	No
Family Scolopacidae					
Eurasian woodcock <i>Scolopax rusticola</i>		LC	2	2	No
Family Strigidae					
Eagle owl <i>Bubo bubo</i>		LC	2	2	No
Family Sturnidae					
Tristram's starling <i>Onychognathus tristramii</i>		LC	1	1	No
Common starling <i>Sturnus vulgaris</i>		LC	1	1	No
Family Turdidae					
Mistle thrush <i>Turdus viscivorus</i>		LC	4	4	Yes

*LC, Least Concern; NT, Near Threatened; VU, Vulnerable, EN, Endangered

Panthera pardus nimr (Amr, 2012), and several others are seriously threatened, including the Nubian ibex, gazelle species (Amr, 2012) and the Asian houbara (Eid & Qaneer, 2013). The species that have declined in Jordan during the past 3 centuries have been mainly of the orders Artiodactyla and Carnivora (Qumsiyeh et al., 1994, 1996).

Much of the existing academic research on Facebook has focused on identity presentation and privacy concerns (Gross & Acquisti, 2005; Stutzman, 2006) and there has been limited research using Facebook groups as a tool to assess the magnitude of illegal hunting. Hunters join Facebook

to create and support virtual groups based on their common interests and to maintain connections with fellow hunters, presenting their hunting achievements and expressing their satisfaction with the sport. Braden (2015) studied illegal recreational hunting in Russia, using the media, government reports, environmental organizations and social media. Essen (2016) followed informal conversations on Facebook to examine illegal hunting in Sweden.

It is clear from the level of Facebook activity monitored during the survey period that hunting is thriving in Jordan. Most of the seven groups studied were posting photographs

TABLE 2 Comparison of the legal bag limits for four bird species that can be legally hunted and the maximum bag sizes recorded on Facebook during January 2015–January 2016.

Species	Legal bag limit in 2015	Maximum no. in a single photograph	No. of hunters in each photograph (including the photographer)
Chukar partridge	One in each trip on Friday & Sunday of each week	76	2
Sand partridge	One in each trip on Friday & Sunday of each week	24	2
Common quail	15 per day	80	5
Turtle dove	15 in each trip on Friday & Sunday of each week	92	2

and information on kills on a regular basis and with increasing frequency through the year. The 4,707 individual animals killed in the 13 months of study is worryingly high, especially as the seven groups are only a small proportion of licensed hunters (4,000 registered by the Royal Society for the Conservation of Nature in 2005) and of the estimated 5,000–10,000 unlicensed hunters. The overall number of animals killed annually, therefore, is likely to be much higher than the number we recorded in Facebook posts. There is therefore little doubt that hunting is a major factor influencing the decline of wildlife species and undermining the success of conservation efforts in the Kingdom.

Our survey also revealed that hunters are killing species protected under Jordanian law and species categorized as threatened on the IUCN Red List (most of which are also protected under Jordanian law). In total we recorded 34 protected species killed illegally, including two migratory birds of prey, the steppe eagle and saker falcon. The saker was apparently captured for trade with visitors from the Arabian Gulf, as evident from the posted photograph, and the eagle was shot. Both of these species are in serious decline (BirdLife International, 2016a,b). The saker falcon is listed on Appendix II of CITES, which highlights the need to improve the control of border trade. The striped hyaena *Hyaena hyaena*, categorized as Near Threatened on the IUCN Red List (AbiSaid & Dloniak, 2015), was also killed in significant numbers, with a total of 27 individuals documented in photographs. It is listed on Schedule II of the Jordanian wildlife protection law (MOA, 2015) and is often hunted for traditional medicinal uses and as a sexual tonic (Aloufi & Eid, 2016). The high number of ungulates killed is of particular concern. We recorded 115 Nubian ibex, 23 goitered gazelles, two dorcas gazelles and one mountain gazelle in photographs on Facebook. There has been a marked decline of gazelles in Jordan, with an estimated goitered gazelle population of < 100 individuals (Kiwani et al., 2001). Gazelles remain at risk of extinction in Jordan (Amr, 2012) and will not be able to sustain such high hunting pressure.

Despite the efforts of the Royal Society for the Conservation of Nature and the Royal Department for Environmental Protection, it is evident from our findings that the enforcement of Jordan's hunting laws is no longer effective. We suggest that there are a number of key issues that need to be addressed: (1) the increasing number of

licensed and unlicensed hunters in Jordan and the lack of sufficient enforcement officers, especially outside protected areas; (2) poor coordination between the parties involved in the management of hunting (including the hunters themselves); (3) a lack of awareness within local communities of the importance of wildlife and conservation; (4) inconsistent support from government and judicial bodies in upholding the law; and (5) inadequate funding to support the expansion of ranger services and effective patrolling. It is also important to note that some of the hunters operating in Jordan are from the Arabian Gulf, most of whom are probably unlicensed. Of the 23 goitered gazelle carcasses recorded, 10 (43%) were apparently killed by hunters from the Gulf, with the support of Jordanian guides. In 2013 13 dorcas gazelles were killed in Wadi Araba by hunters from the Gulf (E. Eid, pers. obs.).

Our findings indicate that the management of hunting in Jordan needs to be reviewed, to develop a much more effective licensing and enforcement system that engages all parties, including hunters' groups and the recently formed Outdoor Sport Association. This needs to be linked to a nationwide awareness campaign highlighting the importance and benefits of managing wildlife in a sustainable way. Under Jordanian law photographs of hunting bags, such as those we documented on Facebook, are not sufficient to convict hunters. Enforcement of laws needs to be enhanced to halt the excessive hunting of both protected and unprotected species in Jordan. As a member of the National Wildlife Committee in Jordan, Outdoor Sport Association will ensure our results are used as a basis for future decisions on permits and bag limits for hunted species.

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Author contributions

EE collected data and identified species, analysed the data and wrote the article. RH collected and analysed data.

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Biographical sketches

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