

Former and present habitats of Grey partridge (*Perdix perdix* L.) and Rock partridge (*Alectoris Graeca* Meisner) in Federation of Bosnia and Herzegovina

Nekadašnja i sadašnja staništa jarebice poljske (*Perdix perdix* L.) i jarebice kamenjarke-grivne (*Alectoris Graeca* Meisner) u Federaciji Bosne i Hercegovine

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ABSTRACT

The main problem in small game management today is habitat loss. Agricultural development and modern techniques in crop farming have a high impact on small game populations. To present this impact in the Federation of Bosnia and Herzegovina, we analyzed and determined former and present habitats of two traditionally important gamebird species: Grey partridge (*Perdix perdix* L.), and Rock partridge (*Alectoris Graeca* Meisner)

Key words: grey partridge, rock partridge, habitat

INTRODUCTION – Uvod

The Grey partridge was once the main species of small feathered game in Bosnia and Herzegovina. With the development and intensification of agriculture, ie the creation of a modern agrobiotope instead of the former habitats, the number and range of this species has drastically decreased. According to statistical data (Statistical Yearbook of SRBiH 1946-1990), the harvesting of this species decreased from 15,000 birds during the 1950s, to about 5,000 during the 1960s, 4,000 and 3,000 birds during the 1970s and 1990s. According to the data of the Statistical Yearbook of the FBiH, in 2019, the harvesting of partridges amounted to only 700 birds, while the shooting of both grey partridges and rock partridges was shown together.

The Grey partridge is marked on the Red List of the Federation of BiH as NT (Low-Risk Species), ie a species that is not currently endangered and has a stable population, but for which there is a danger of population decline due to constant habitat endangerment. However, on the World Red List, this species is marked with EN, ie as an endangered species. The lack of real data and serious research in BiH has certainly affected the existing categorization of the partridge in the Federation of Bosnia and Herzegovina.

The rock partridge is also a very attractive and important autochthonous species. According to available data, it experienced the same fate as the partridge, with a similar reduction in the numbers and harvesting. On the Red List of the Federation of BiH is marked as DD (In-

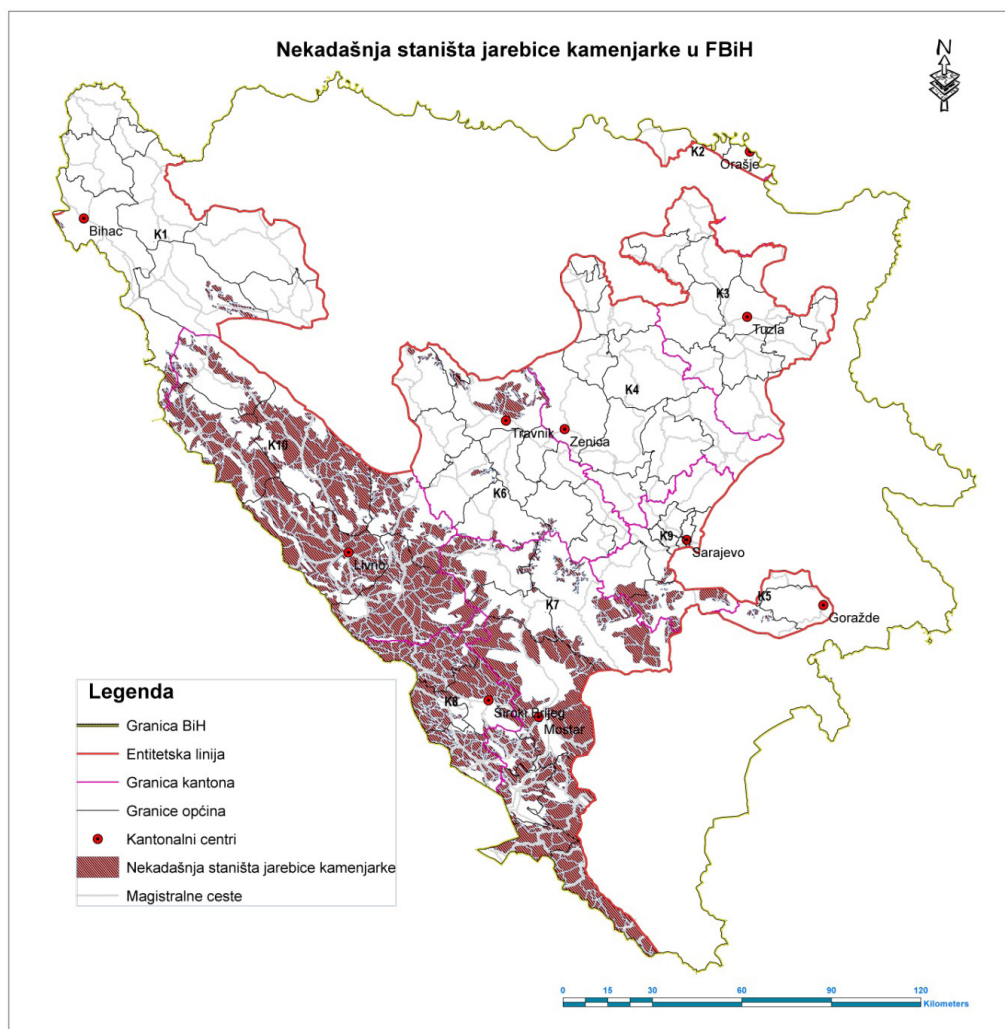


Figure 1: Former habitats of rock partridge in Federation of BiH

Karta 1: Nekadašnja staništa jarebice kamenjarke u Federaciji BiH

sufficiently known species, ie safe or probably endangered species whose categorization cannot be performed due to lack of data). Within this work, we try to provide realistic data on partridge habitats, so that, it will be possible to start developing long-term protection and management plans.

By collecting and obtaining new data on these species, a contribution will be made by EU nature protection directives, which will serve to establish the Natura 2000 network in BiH, especially when it comes to such important indigenous species.

MATERIAL AND METHODS – Materijal i metode

Based on available historical literary sources (Laska 1905, Dimitz 1905, Statistical Yearbook of SR BiH 1960-

1992, Lovački list 6-10, 1953, 1954, 1958), we inspected the former representation of both species in Bosnia and Herzegovina and the Federation. BiH. After collecting these data, maps of former habitats of partridge and partridge in BiH, ie the Federation of Bosnia and Herzegovina, were made.

A network of 1x1 km = 100 ha (one hunting unit) was made on the identified former habitats of both species, and the structure of areas according to CORINE LAND COVER (CLC) was inspected. This network was selected following applicable legislation (Law on Hunting, Professional Basis for Rating and Determination of Hunting Productive Areas in FBiH Hunting Grounds), and because the Professional Basis for Determining Hunting Productive Areas (hereinafter LPP) and credit rating classes in FBiH hunting grounds represent the starting point for determining the framework for the

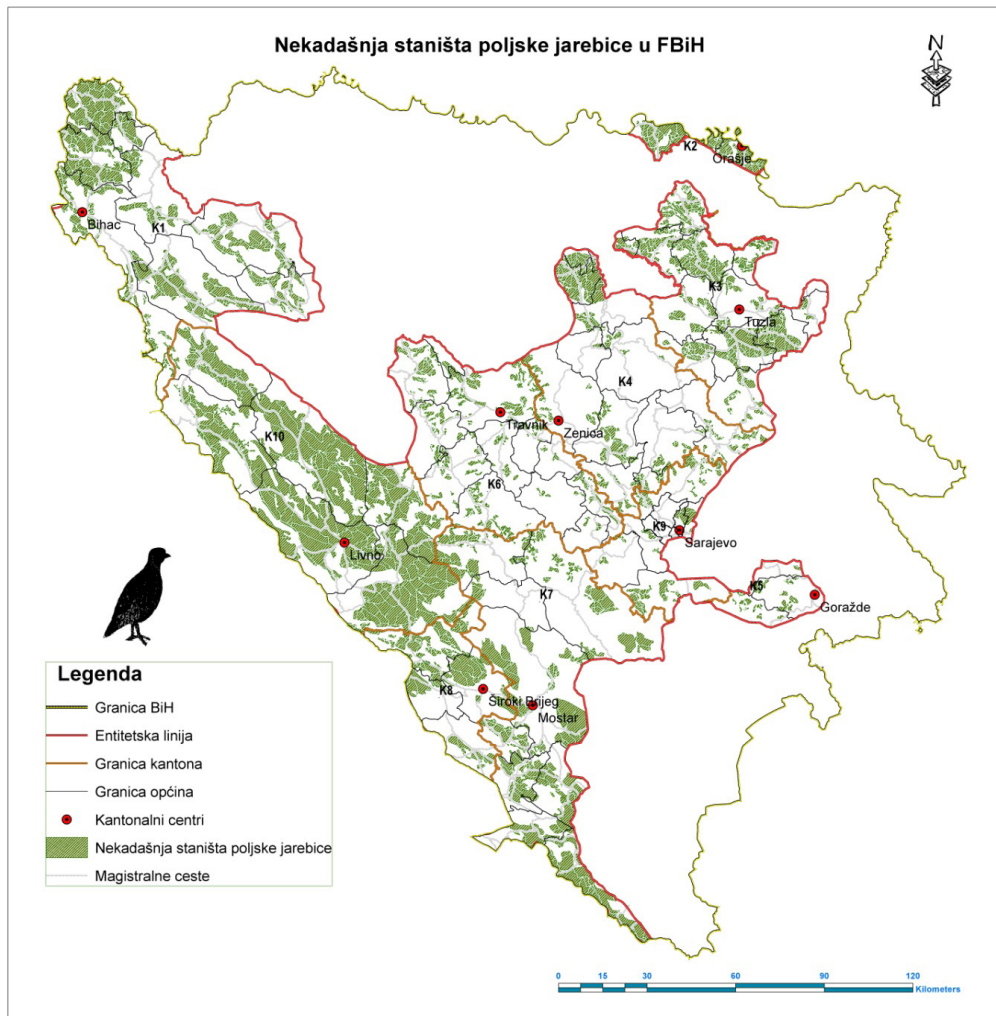


Figure 2: Former habitats of grey partridge in Federation of BiH

Karta 2: Nekadašnja staništa jarebice poljske u Federaciji BiH

management of economically important game species, which are expressed per hunting unit.

Within each canton and associated hunting grounds, the presence, counting and accurate recording of the presence of grey partridge and rock partridge were performed, according to the methodology (Kunovac 2009): Well-trained bird dogs were used, which are characterized by firm pointing. When the dogs discover the partridges and stop, the guide approaches and catch the dog so as not to further disturb or disperse the partridges. By counting the birds, the counter determines the number of individuals in the flock and enters the location on the appropriate maps. This was realized twice during the year: in the month of February-May when the partridges are in pairs and before the vegetation becomes too high and in the second half of the year, ie in the months of August-November..

During each count, the appropriate map of the locality or area was used, and the location (coordinates) of each pair, the flock of partridges, or individual birds were entered on the appropriate map with the Mobile Mapper CE instrument. Based on the obtained data, the current habitats of partridge and rock partridge in the territory of FBiH were mapped.

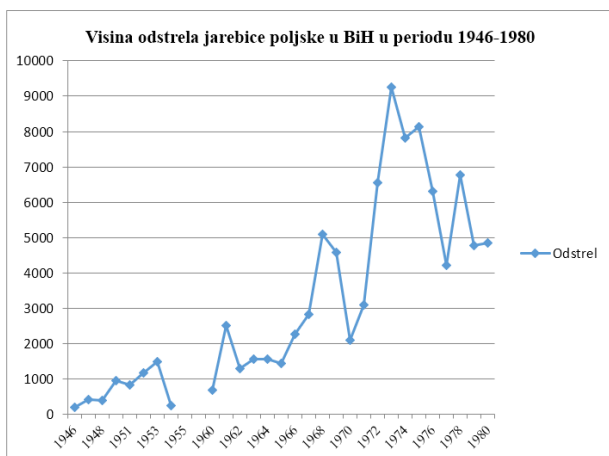
RESULTS AND DISCUSSION –

Rezultati i diskusija

After collecting historical data, maps of the former habitats of grey and rock partridge in BiH, ie the Federation of Bosnia and Herzegovina, were made, as shown on Figure 1 and Figure 2. The total area of former rock partridge habitats in the FBiH was 520,000 hectares. The total area of former grey partridge habitats in the FBiH was 729.244 hectares.

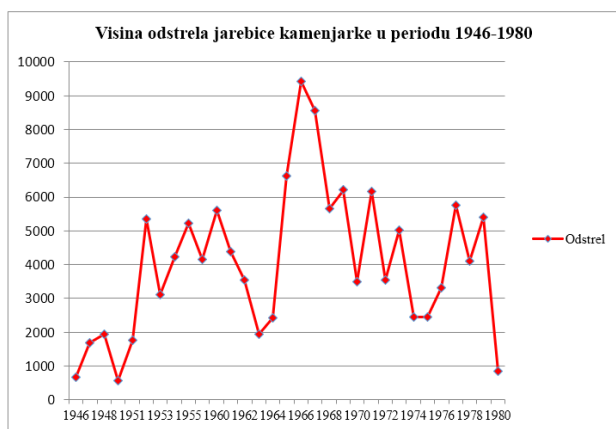
Numbers and harvesting - Brojnost i odstrel

Based on data presented in statistical yearbooks, made appropriate graphs for the number of grey and rock partridges, as well as graphs showing the harvesting of these two species. The data are presented in two types, considering the presentation of the same in the statistical yearbooks for SR BiH. Until 1980, shooting data were reported for both species separately, and in later periods for both species in total, which we have shown for each period separately in the following graphs:



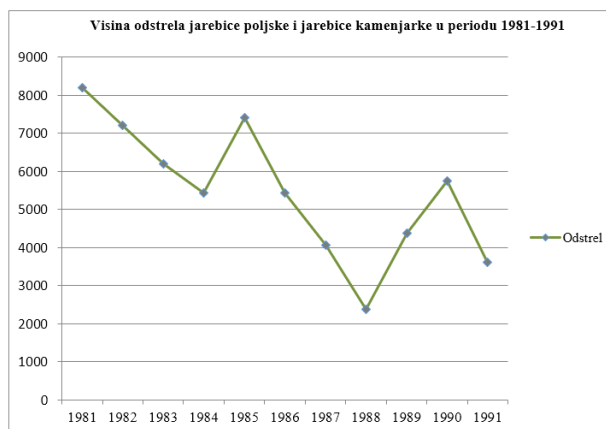
Graph 1: Harvesting of grey partridge in Bosnia and Herzegovina in 1946-1980 period. (Note: data for 1955 and 1956 year are missing)

Grafikon 1: Visina odstrela jarebice poljske u Bosni i Hercegovini u periodu 1946-1980; (Napomena: nedostaju podaci za 1955 i 1956 godinu).



Graph 2: Harvesting of rock partridge in Bosnia and Herzegovina in 1946-1980 period.

Grafikon 2: Visina odstrela jarebice kamenjarke u Bosni i Hercegovini u periodu 1946-1980;



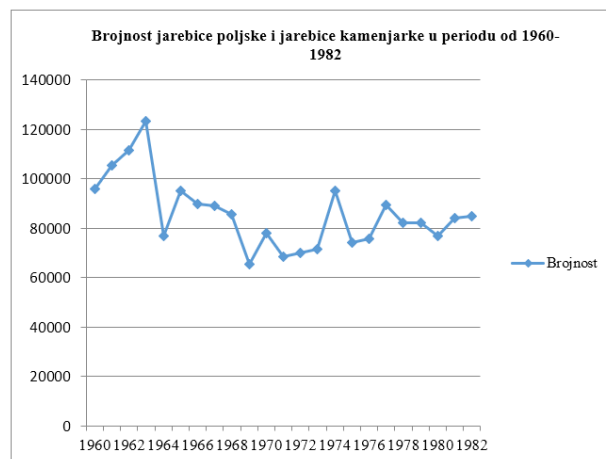
Graph 3: harvesting of both partridge species in Bosnia and Herzegovina in 1981-1991 period.

Grafikon 3: Visina odstrela obje vrste jarebica (poljska i kamenjarke) u Bosni i Hercegovini u periodu 1981-1991.

The number of these two species was also expressed together, except for the data from 1953 (Development Plan of the Association of Hunting Organizations of BiH 1953), when the following numbers were stated separately for these species:

Grey partridge – 68.000 birds

Rock partridge – 56.000 birds



Graph 4: Number of both partridge species (grey and rock) in Bosnia and Herzegovina in 1960-1982.

Grafikon 4: Brojnost obje vrste jarebica (poljska i kamenjarke) u Bosni i Hercegovini u periodu 1960-1982.

After 1982, the number of these species was not stated in the statistical yearbooks of SR BiH, but in the data of the then Hunting Association of Yugoslavia (General Guidelines for the Development of Hunting in SFRY 1990-1995), we found data for Bosnia and Herzegovina, which we compared with data for both species reported in 1953:

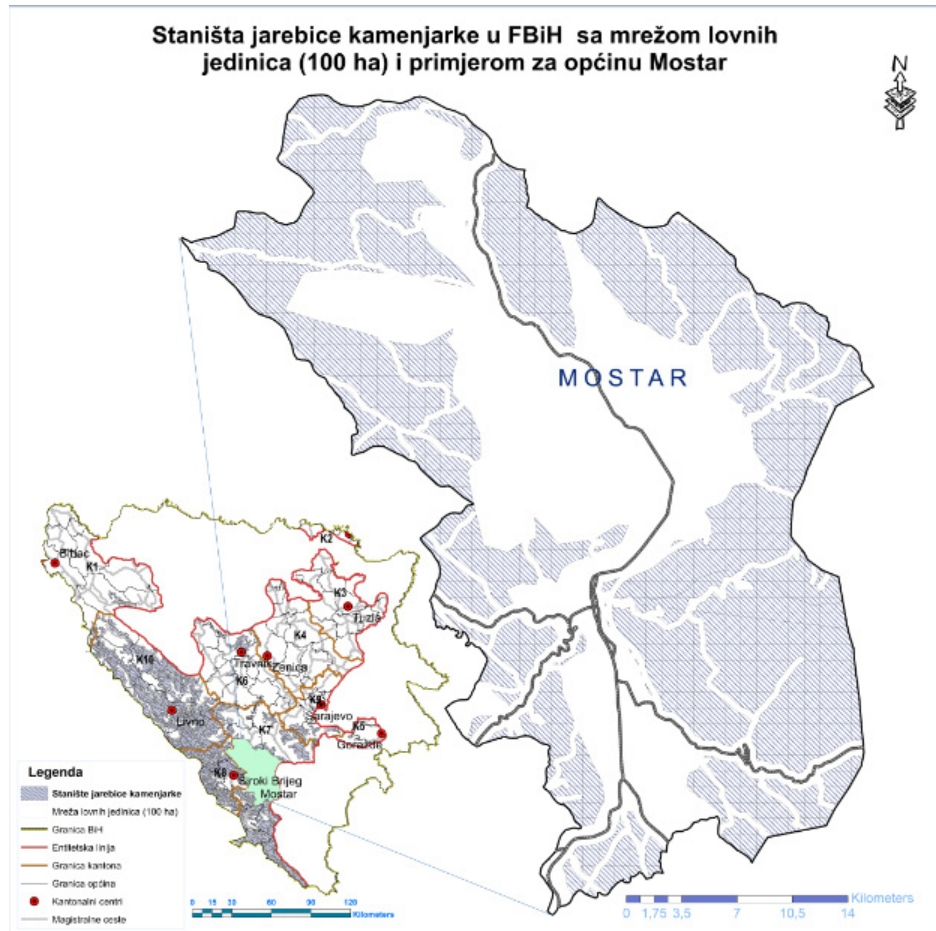


Figure 3. Rock partridge habitats in FBiH with a network of hunting units (100ha) and an example for the municipality of Mostar

Karta 3: Staništa jarebice kamenjarke u FBiH sa mrežom lovnih jedinica (100ha) i primjerom za općinu Mostar

Table 1: Comparing of numbers of grey and rock partridge in 1953 and 1990.

Tabela 1: Uporedba brojnosti jarebice poljske i jarebice kamenjarke u 1953 i 1990 godini;

Species/Vrsta	Numbers/ Brojnost 1953	Numbers/ Brojnost 1990	Differen- ce in %/ Razlika u %
Grey partridge/ Jarebica poljska	68.000	19.890	-70,75%
Rock partridge/ Jarebica kamenjarka	56.000	27.490	-50.91%

As we can see from the table, in 37 years, the number of both species in Bosnia and Herzegovina has significantly decreased, with the partridge by more than two thirds, and with the rock partridge by slightly more than half. This is in line with the data on reported culling (for

both species and in total) on previous graphs, where a clear decline has been observed since the early 1980s.

Present habitats - Sadašnja staništa

The network of hunting units is shown is shown on Figure 3 and Figure 4 (with enlarged examples for clarity).

After a detailed search with dogs, and following the established methodology and collected data, we started making maps of the current habitats of partridges and partridges, which are shown on Figure 5 and Figure 6.

As can be seen, the current habitats of the rock partridge in the Federation of BiH have remained within the boundaries of the former ones. The reason for this is that the habitats of this species include areas mostly away from human settlements, barren and unproductive areas, and have accordingly suffered less negative anthropogenic impacts. The area of the current rock partridge habitats is 480,000 hectares (Picutre 1).

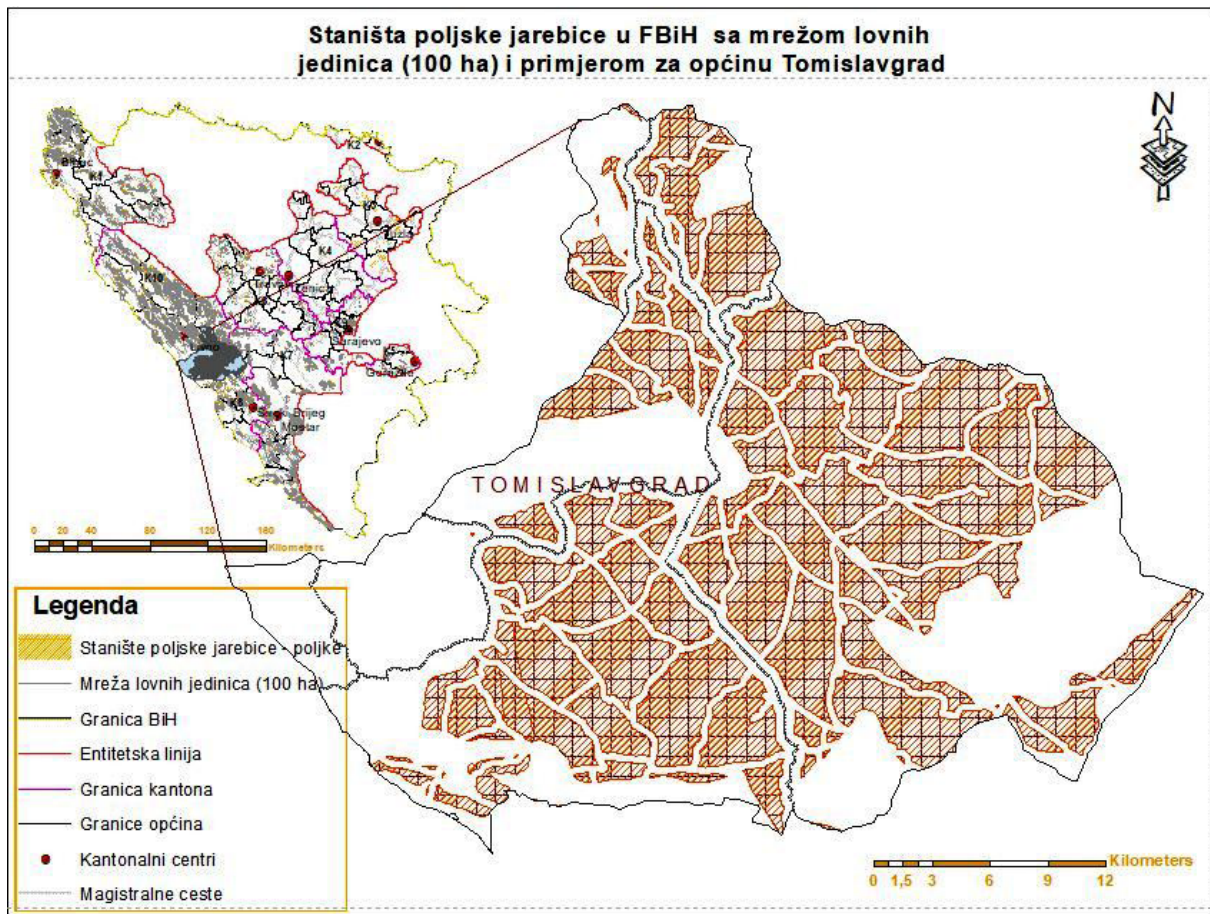


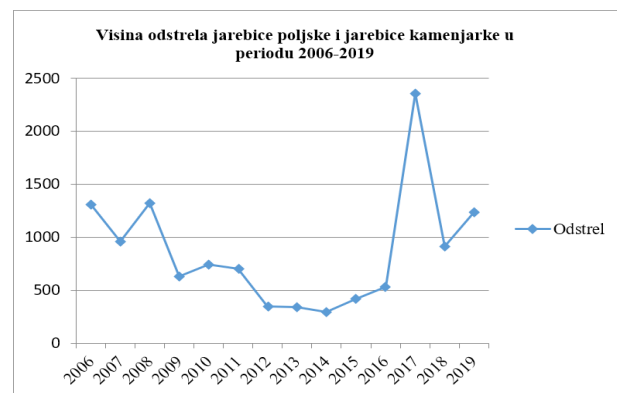
Figure 4: Grey partridge habitats in FBiH with a network of hunting units (100ha) and an example for the municipality of Tomislavgrad

Karta 4: Staništa poljske jarebice u FBiH sa mrežom lovnih jedinica (100ha) i primjerom za općinu Tomislavgrad

The current habitats of the grey partridge have been significantly reduced compared to the former. This species has also disappeared from its former best habitats, especially in the Tuzla and Posavina cantons. The reasons for this are primarily intensive agriculture with the mass use of pesticides, the lack of agricultural forest belts and hedges around arable land, as well as changes in the use of agricultural land (usually in construction). The area of current grey partridge habitats in the Federation is 467,000 hectares. The enumerated reasons have caused that today grey partridges can be found more often in the high mountains instead of in the former habitats in the lowlands, which is illustrated on Picture 2.

NUMBERS AND HARVESTING - Brojnost i odstrel

In the FBiH statistical yearbooks, hunting data have only been reported since 2006. Data on partridge and partridge are shown only in the amount of annual shooting, together for both species, as shown in the following graphic:



Graph 5: Harvesting of both species (grey and rock) in Federation of BiH for 2006-2019 period

Grafikon 5: Visina odstrela obje vrste jarebica (poljska i kamenjarka) u Federaciji Bosne i Hercegovine u periodu 2006-2019



Picture 1: Small parcels with different cultures (extensive agriculture) are very convenient for both species of partridges. Nowadays those parcels are predominantly represented in rock partridge habitats.

Slika 1: Male parcele sa različitim kulturama (ekstenzivna poljoprivreda) su jako pogodne za obje vrste jarebica. Danas, ovakve parcele su uglavnom zastupljene u staništima jarebice kamenjarke.

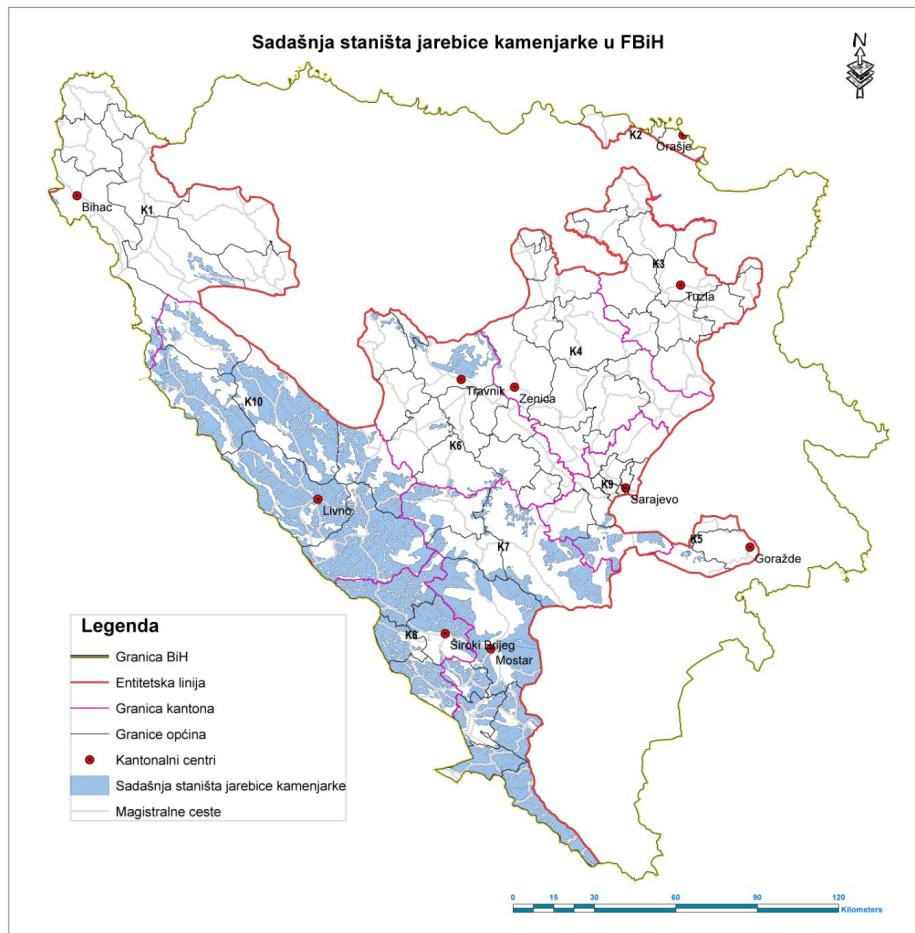


Figure 5: Present habitats of rock partridge in Federation of BiH

Karta 5: Sadašnja staništa jarebice kamenjarke u Federaciji BiH

CONCLUSIONS – Zaključci

In recent decades, the number of small game has been steadily declining. Hunting experts have long been looking for the causes of declining numbers in the wild itself, and not in the deterioration of living conditions, which are necessary for the survival of any species.

What kind of environment does the small game need, which includes, among other species, the grey and rock partridge? Small game is by nature more of an inhabitant of open areas. The term “open” does not refer to today’s open areas, primarily agricultural, where monocultures predominate.



Picture 2: The grey partridge flock at the Vlašić mountain (around 1500 m.a.s.l.)

Slika 2: Jato poljskih jarebica na planini Vlašić (oko 1500 m.n.v.)

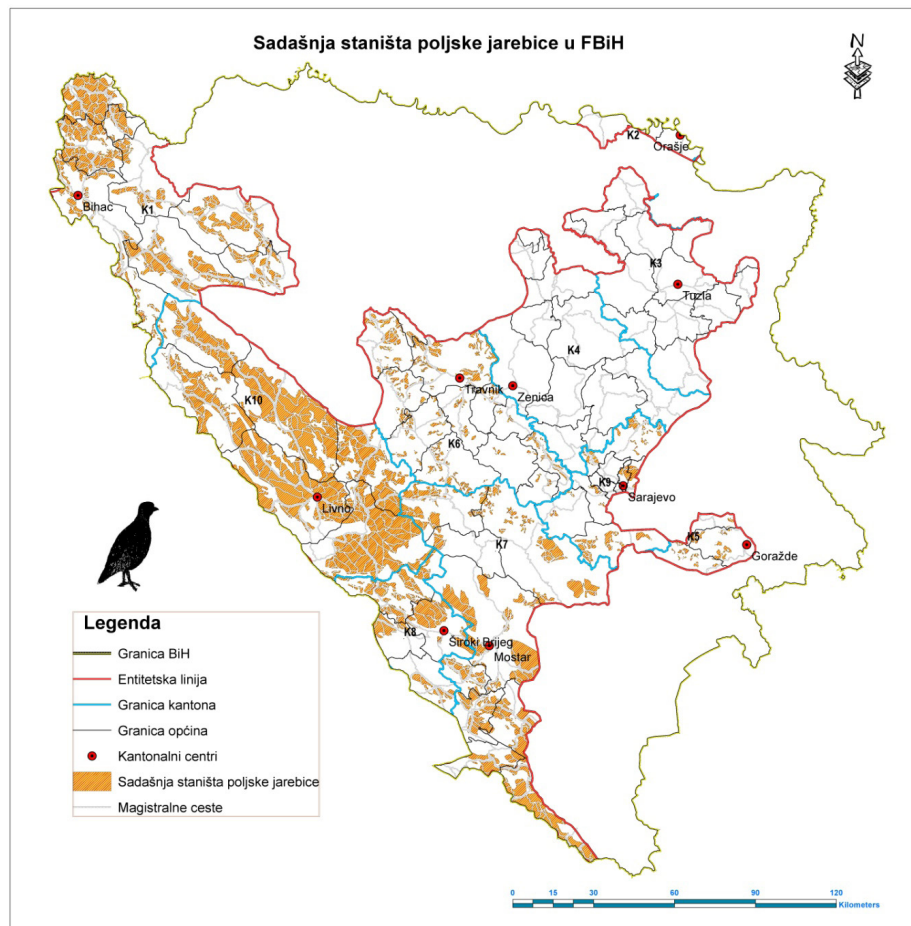


Figure 6: Present habitats of grey partridge in Federation of BiH

Karta 6: Sadašnja staništa jarebice poljske u Federaciji BiH

Living conditions for the small game began to deteriorate with the development of agriculture, the introduction of mechanization, and the use of chemicals. With the intensification of agriculture, natural shelters and suitable places for raising young people disappeared, and large areas with monocultures were created. All this does not correspond to the living conditions for small game, so in

terms of preserving small game and increasing the number, of hunting grounds that cover a large number of agricultural areas, the following should be done:

- Strict compliance with the law on agricultural land and especially the provisions on the use of pesticides, maintenance of hedges, borders, and agricultural forest belts.

- in cooperation with the Federal Ministry of Agriculture, Water Management, and Forestry, start drafting a new Expert Basis for rating and capacity of hunting grounds, following the results of this work, because it is more than obvious that the existing Expert Basis does not meet the conditions in the Federation of BiH. from the Republic of Croatia.
- maintain the allowed number of predators per unit of a hunting area
- harmonize the use of the hunting-productive area with other target groups during breeding and care for raising young
- achieve a more even water supply during dry periods, ie. when achieving extreme climatic conditions by making watering places, ponds, as well as water collection points in cisterns or troughs
- building shelters for feeding in severe winter conditions with various combinations of grain foods
- enriching the food range in scarce habitats, planting fruit trees and shrubs, or supporting these species during forestry works.
- maintaining an appropriate degree of shrubby vegetation behind which it will find shade as well as shelter from predators while regulating excessive overgrowing of open areas.
- perform regular controls of hunting productive areas and continuously sanction the use of open flames on those areas by other target groups (farmers, nomads, mushroom and medicinal plant collectors, motorcyclists, mountaineers, etc.)
- conduct continuous and annual monitoring of both species with counting and control of growth
- do not hunt in areas where there is a small increase of 2 juveniles per pair of both species of partridges

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SAŽETAK

Jarebica poljska je nekada bila glavna vrsta sitne pernate divljači u Bosni i Hercegovini, Razvojem i intenziviranjem poljoprivrede, odnosno stvaranjem savremenog agrobiotopa umjesto nekadašnjih staništa, brojnost i areal ove vrste se drastično smanjio. Prema statističkim podacima (Statistički godišnjak SRBiH 1946-1990), odstrel ove vrste se smanjio od 15.000 kljunova tokom pedesetih godina prošlog vijeka, na oko 5000 tokom šezdesetih, 4000 i 3000 kljunova tokom sedamdesetih do devedesetih godina prošlog vijeka. Prema podacima Statističkog godišnjaka FBiH, u 2019 godini, odstrel jarebice iznosio je svega 700 kljunova, pri čemu je zajedno iskazan odstrel i jarebice poljske i jarebice kamenjarke. Jarebica poljska je na Crvenoj listi Federacije BiH označena kao NT (Niskorizične vrste), odnosno vrsta koja u ovom trenutku nije ugrožena i ima stabilnu populaciju, ali za koju postoji opasnost od smanjenja populacije usljed konstantnog ugrožavanja staništa. Međutim na svjetskoj Crvenoj listi, ova vrsta je označena sa EN, odnosno kao ugrožena vrsta. Nedostatak realnih podataka i ozbiljnih istraživanja u BiH, svakako je uticao na postojeću kategorizaciju jarebice poljske u Federaciji Bosne i Hercegovine.

Jarebica kamenjarka-grivna, takođe je vrlo atraktivna i značajna autohtona vrsta, a prema dostupnim podacima doživjela je istu sudbinu kao i jarebica poljska, uz slično smanjenje brojnosti i visine odstrela. Na Crvenoj listi Federacije BiH označena kao DD (Nedovoljno poznate vrste, odnosno sigurno ili vjerovatno ugrožene vrste čija se kategorizacija ne može izvršiti zbog nedostatka podataka). Realizacijom ovog rada dobiće se realni podaci o veličini staništa ove dvije vrste, pa će u skladu s tim biti moguće pristupiti izradi dugoročnih planova zaštite i gospodarenja.

Na osnovu dostupnih istorijskih literarnih izvora izrađene su karte nekadašnjih staništa ove dvije vrste, a potom je izrađena mreža 1x1 km=100 ha (jedna lovna jedinica), te izvršen uvid u strukturu površina prema CO-RINE LAND COVER (CLC). Potom je izvršen detaljan obilazak svih nekadašnjih staništa te utvrđivano prisustvo obje vrste u skladu sa odabranom metodologijom. Rezultati pokazuju da su se staništa obje vrste značajno smanjila, a posebno kod jarebice poljske, koja je skoro nestala sa svojih najznačajnijih nekadašnjih staništa. Takođe, analizirana brojnost i odstrel u periodima 1946-1990 i 2006-2019 godine pokazuju značajno smanjene, koje je kod jarebice poljske manje za dvije trećine u odnosu na prošli vijek. Na osnovu rezultata rada, može se zaključiti da je krajnje vrijeme da se preduzme odgovarajuća zaštita ovih vrsta, uz stalan monitoring te izradu odgovarajućih planova upravljanja.