MANAGEMENT OF GRASSLANDS FOR THE CONSERVATION OF THE BIRD SPECIES *LANIUS MINOR* AND *FALCO VESPERTINUS* IN ACCORDANCE WITH THE COMMON AGRICULTURAL POLICY, IN ROMANIA. CASE STUDY

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Abstract. *The researches presented in this work were located in the hilly area of the East of Timis County, with altitudes between 351 - 489 m, on a total area of 43062.84 ha and an area occupied by grasslands of 11292 ha, divided into four administrative-territorial units (Ohaba Lungă, Făget, Mănăştiur and Margina). The main purpose of this study is to establish the sustainable management of grasslands and the opportunities for financial support, in order to protect and conserve the bird species Lanius minor and Falco vespertinus. In this context, three main objectives were pursued: (1) identification of grasslands in the study area and their "trajectory" over time; (2) creation of a map showing the presence of the two species of grassland birds, of community importance, Lanius minor and Falco vespertinus, in the study area (according to PNDR 2014-2020) and (3) based on the possible threats, to create integrated grassland management measures, in the study area, in accordance with EU CAP policies, aimed at the actions of protection and conservation of the birds of community importance. The work methodology, supported by geomatics techniques, statistical analyses and field observations, followed five stages: selecting the study area, drawing up the thematic maps, identifying the grassland surfaces - evolutionary trends, analyzing the EU CAP policies to subsidize important grassland for birds and identifying threats to the species Lanius minor and Falco vespertinus, in the area of interest. Through the five stages of work, the measures of sustainable grassland management have been established. Following the spatial analyses, a slight variation of the meadow surfaces was demonstrated, the main "support" of the studied bird species, produced in particular, by demographic mechanisms, in the first period favorable to the exploitation of agricultural lands, and in the second part of the analyzed range, unfavorable, with adverse consequences in the mode of agricultural exploitation, as well as for biodiversity. In order to mitigate these phenomena, the EU CAP policies, implemented in Romania by the PNDR (2014-2020) through the agri-environment and climate measure, stimulate through subsidies the measures of "good practices" in the grasslands of the analyzed area. In order to protect and conserve bird species, a set of general, but also specific measures to grassland habitats has been proposed.*

Keywords: *analysis, biodiversity, protection, grasslands, management.*

INTRODUCTION

Meadows maintain a high biodiversity and globally they are important for the conservation of many species of flora and fauna.

The grassland ecosystems in Romania are characterized by a mosaic appearance (herbaceous plants, shrubs, fruit trees, trees), being provided optimal conditions for a large number of species of plants, birds (MIHAI, C, 2015) and animals (BOSTAN, C, 2018).

The heterogeneity of grassland habitats, generally framed by protection centers, ensures the coexistence of species and maintains the diversity of bird communities that inhabit and/or transit these ecosystems (CODESIDO, M, 2013).

Grasslands are important for maintaining the diversity of birds in Europe, especially for endangered species. Concerns about reducing bird populations have stimulated a variety of management plans and strategies for bird conservation (DRUM, R.G., 2015); all suggesting the need to understand how socio-economic factors influence decision-making processes of landowners in which they live.

The Strategic Plans of the Common Agricultural Policy (CAP), in the countries of the European Union (EU), combine the instruments of financial support in order to protect the biodiversity of grasslands (CĂLUSERU, 2013), improve the quality of the ecosystem services and the conservation of habitats and landscapes. By extinction, in Romania, the National Program of Rural Development (PNDR 2014 - 2020) sets limits for the areas in which financial support is provided for the preservation and conservation of the species in the grassland habitats from protected areas and also outside them. Thus, farmers holding grasslands in which the bird species *Lanius minor* and *Falco vespertinus* are concentrated benefit from subsidies through the agri-environment and climate measure.

The bird species ***Lanius minor***, widespread in Southern and Central Europe, is a migratory species wintering in Africa . It prefers open areas with isolated trees and bushes (DELIN, HAKAN, 2016). The European population is between 620,000 and 1,500,000 pairs, representing a large population, accounting for more than half of the global population of this species. Although in some countries the numbers have remained constant, there has been a moderate decline (1970-1990), with a decrease even in Romania, which currently has one of the largest nesting numbers (65,000 - 130,000 pairs).

The status of the population at EU level, evaluated at species level, was based on the reports submitted by the Member States pursuant to Article 12 of the Birds Directive, on the IUCN Red List, which assesses the risk of extinction of the species, resulting in *Lanius minor* not having a worrying status at global, European and the EU levels.

In terms of conservation status, the species *Lanius minor* is mentioned in the Directive 2009/147/CE of the European Parliament and of the Council, of 30 November 2009, on the conservation of wild birds – Annex 1 and Bern Convetion – Convention on the conservation of European wildlife and natural habitats – Annex II. In Romania, the species is mentioned in GEO 57 of 2007 on the regime of protected natural areas, conservation of natural habitats, of flora and fauna, in Annex III, emergency ordinance approved by Law 49 of 2011.

The species ***Falco vespertinus*** is present in the East and South of the European continent, with a population that represents more than half of the world population of this species, but also in the South of Russia, occupying especially areas of steppes and cultivated lands, with trees (DELIN, HAKAN, 2016). The Eastern boundary consists of Lake Baikal, the Northern one of Estonia and the Southern one of the Black Sea. The European population of the species is between 26,000 and 39,000 pairs, most being found in Russia, where over 20,000 pairs nest.

The nesting population in Romania is estimated at 1,000-1,500 pairs and between 7,000 and 20,000 individuals can be observed during the passage.

The grassland surfaces (as they are analyzed in the present work) represent areas in which the species lives, being a typical plain species, preferring the open areas with tree clumps in the steppe and silvostepa habitats.

From the point of view of conservation status, the species suffered a significant decline during the period 1970-1990, in some countries, however in other countries the population remained constant. However, there has been a steady decline in population in Eastern Europe and Russia, with a downward trend overall. The same population trend, in decline, is also noticeable in the populations of Romania.

From the standpoint of conservation status, the species *Falco vespertinus* is mentioned in several international acts and agreements, namely: Directive 2009/147/CE of the European Parliament and of the Council, of 30 November 2009, on the conservation of wild birds – Annex 1; Bern Convetion – Convention on the conservation of European wildlife and natural habitats – Annex II; Bonn Convention - Convention on the conservation of Migratory Species of wild Animals - Annex 1 and Annex II; MoU Raptors – Memorandum of understanding on the conservation of migratory birds of prey in Africa and Eurasia – under Bonn Convention - Annex 1; CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora - Annex 1I [10]; EU regulation of trade of fauna and flora – Annexa A.

In Romania, the species *Falco vespertinus* is mentioned in GEO 57 of 2007, Annex III, emergency ordinance approved by Law 49 of 2011. The IUCN Red List assesses the species as endangered, with threatened species status at the European continent and globally.

At EU level, the population is between 1,700 and 2,900 pairs, being a species under the criterion threatened, due to the fact that it meets one or more criteria in the IUCN Red List ; the same status as threatened species is available for the populations from Romania.

The strategies for the conservation of the birds that inhabit the grasslands of Romania, use the opportunities (economic incentives) that most effectively align with the current value systems of the land owners. In this context, the main purpose of this study is to establish the sustainable management of the grasslands, according to the specific area of interest and the financial support opportunities, in order to protect and conserve the species of *Lanius minor* and *Falco vespertinus*.

MATERIALS AND METHODS

Location of the study area

The area analyzed in this paper is located in the Northeast of Timiş County and overlaps the territory of four administrative-territorial units (ATU): Ohaba Lungă, Mănăştiur, Făget and Margina (Figure 1).

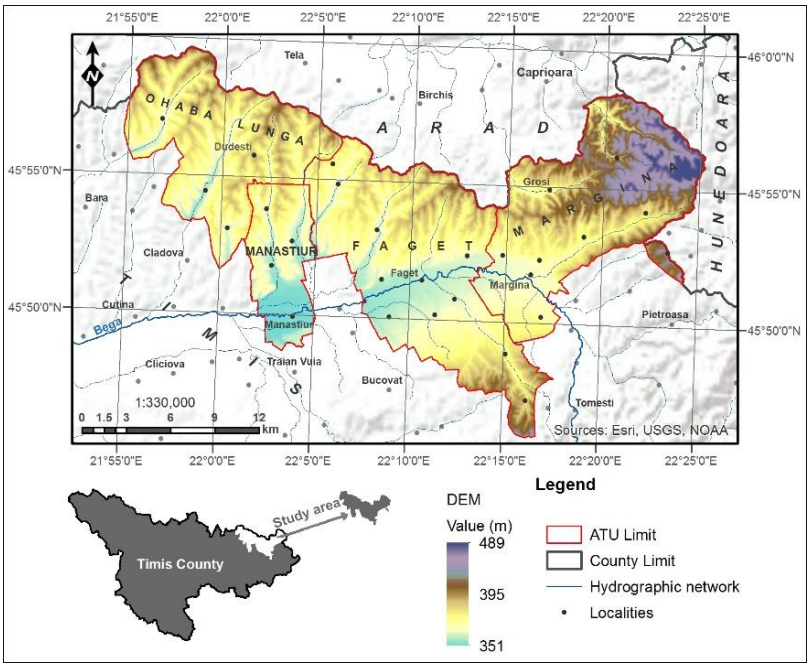


Figure 1 Localization and physico-geographical characterization of the study area
(processing after Arviha Agenției Naționale de Cadastru și Publicitate Imobiliară, CODESIDO,2013)

The total interest area is 43062.84 ha.

From a physical-geographical point of view, the analyzed area presents a hilly relief, with altitudes between 351 - 489 m (Figure 1), most of the territory being framed at Lipova Plateau (Hills). In the Northeastern extremity, it is superimposed on the Bulza Hills (with the maximum altitudes recorded) and in the Southern part, the Făget Depression, with minimum altitudes.

Materials used

To carry out the present study, the materials used were:

- geospatial data, respectively Digital Elevation Model (DEM), ATU limits, county boundaries, hydrographic network, locality map and Corine Land Cover database, 2018 edition (CC 2018);
- PNDR (2014–2020) and documentation and maps from the Agency of Payments in Agriculture (APIA);
- data from the specialized literature regarding the characterization of bird species, the pratological environment, grassland management and exploitation, etc.

Work methodology

The study was carried out in 5 stages according to Figure 2

When ***selecting the study area***, two criteria were considered: to be a rural area, where grasslands have a significant share in subsistence agriculture and to include important grasslands for the bird species *Lanius minor* and *Falco vespertinus*, to highlight the possibilities of sustainable management for the protection and conservation of the two species of birds of community importance.

The maps, made by techniques specific to the Geographic Information Systems (GIS), were exploited, on the one hand, expeditiously, visually and on the other hand, for extracting different data and scientific information.

The identification of the grassland surfaces, from the study area, was done using the CLC 2018 database.

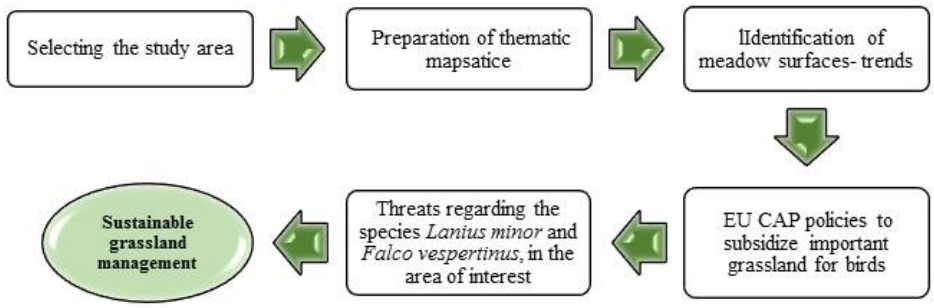


Figure 2 Work methodology

The delimitation of the ATUs - representative for the grasslands in which the two species of community importance *Lanius minor* and *Falco vespertinus* inhabit and benefit from subsidies, in order to conserve the species of birds, through the EU CAP policies, was realized according to the PNDR (2014-2020) in Romania .

The threats regarding the two species of birds that inhabit the grasslands in the analyzed area were identified during field observations, and also based on other sources .

The measures of sustainable management of grasslands for the protection and conservation of the bird species *Lanius minor* and *Falco vespertinus*, in the area of interest, were formulated through the analysis of the specific documentation, but also through their own proposals, in accordance with the specific area.

RESULTS AND DISCUSSIONS

1. Identification of grasslands in the study area and their trajectory over time

The grassland surface of the study area totals 11292 ha (Figure 3), respectively 26% of the entire territory. The areas occupied by grasslands are managed partly by the local public administrations, partly by private companies and private individuals.

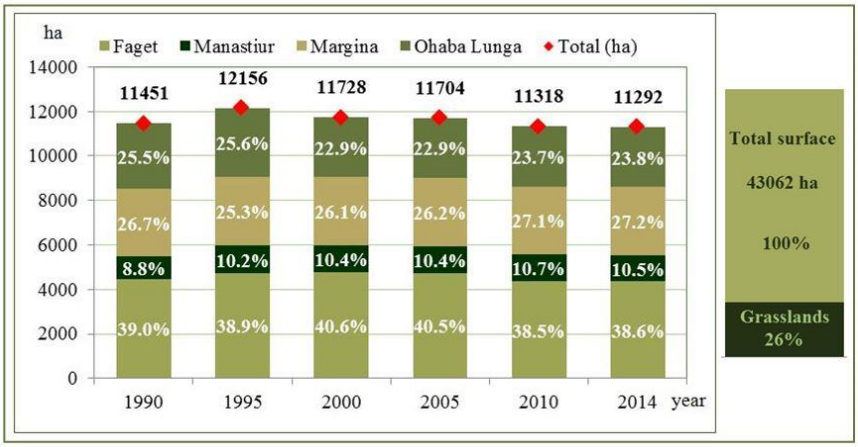
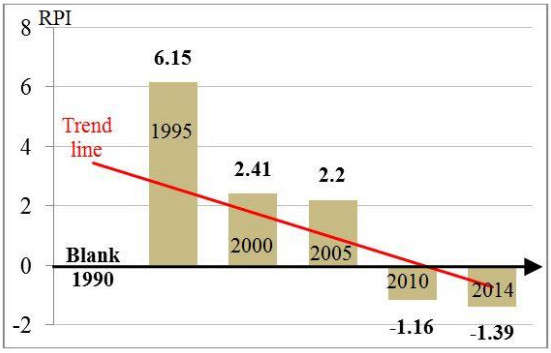


Figure 3 Analysis of grassland surfaces in the study area

The most extensive grassland areas are on the administrative territory of Făget, territory with the largest total area, and the lowest weight was calculated for the administrative territory Mănăştiur (Figure 3).

The analysis of the temporal evolution of grassland surfaces, in general, shows a slight increase in the level of 1995, followed by a slight reduction until the end of the analyzed period. An exception to this tendency is the administrative territory of Făget, in which a surface growth occurred at the level of the year 2000 (Figure 3).

Compared to 1990, at this moment, the area of grasslands has varied to a limited extent (Figure 4).



Legend: RPI – percentage growth rate
Figure 4 Temporal evolution of meadow surfaces

The comparative analysis synthesized in Figure 4 indicates the reduction of grassland surfaces, but the values are within reduced limits. Although the legislation in force in Romania restricts the change of the category of use of the land used as pastures, in some cases the land may be "passed" into other categories or may be "lost" as a result of natural processes (afforestation) or even abandonment.

The reduction of the grassland areas, respectively the direct loss of the life and reproduction habitat, represents a major challenge for the two species of birds of community importance, *Lanius minor* and *Falco vespertinus*, in the analyzed area.

2. Measures of sustainable management of grasslands important for birds

In Romania, the EU's CAP strategies are found within the PNDR (2014-2020), by which the grasslands where the two species of community importance *Lanius minor* and *Falco vespertinus* inhabit, benefit from subsidies through the agri-environment and climate measures, respectively the generic-called package "*Important grasslands for birds*", respectively the variant *Grasslands important for Lanius minor and Falco vespertinus.* At national level, the eligible area covers approx. 260,000 ha of permanent grassland, respectively 174 ATUs. The selected areas, based on data from the standard Natura 2000 forms, comprise approx. 87.4% of the populations of *Falco vespertinus* and approx. 60.86% of the *Lanius minor* populations estimated to be present in the designated SPAs in Romania.

A number of species with an unfavorable conservation status at the global level will benefit indirectly from the implementation of this package.

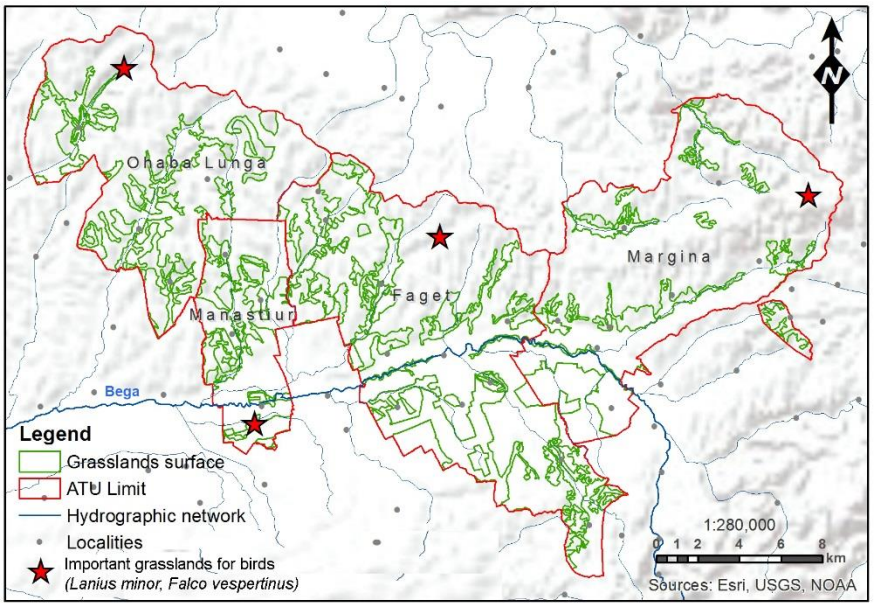


Figure 5 Spatial distribution of grasslands in the area of interest and overlap with the agri-environment and climate measure - *Important grasslands for Lanius minor and Falco vespertinus*
(processing after Arviha Agenției Naționale de Cadastru și Publicitate Imobiliară, Corine Land Cover Database, 2018, PNDR 2014 – 2020)

In the grasslands destined for the conservation of the species of *Lanius minor* and *Falco vespertinus* (Figure 5) the farmers have the obligation to respect the eco-conditionality imposed by the agri-environment and climate measure. A set of sustainable technologies will ensure the protection and conservation of birds in the selected grassland habitats:

- In grasslands, the works can be carried out with mechanized machines of small capacity, according to a well-established calendar;
- The species of trees and shrubs, invasive in the grassland habitats, will be preferentially extracted to avoid degradation of the habitat for birds;
- Only organic fertilizers will be used;
- The mowing of the vegetative mass from the grasslands used as hay must be done by July 1 at the latest;
- The animal load in the important pastures for birds should not exceed 1 LU (livestock unit) per hectare.

At EU level, including Romania, several conservation measures have been put in place to restore / maintain the favorable conservation status of the species *Lanius minor*, namely:

- maintaining a mosaic landscape of habitats, with the presence of trees and shrubs in open agricultural areas;
- maintaining corridors between spontaneous grasslands, which also include trees, tree lines or groups of trees;
- reducing the use of strong insecticides and herbicides as well as agricultural treatments that cause bird poisoning;
- the use of chemical treatment substances on the breeding grounds of species only outside the breeding period;
- prohibition of the burning of stubble and bushes, as well as their maintenance;
- inventory of current and potential breeding areas;
- identification of areas important for the conservation of the species;
- issemination of the studies on species biology and demographic parameters.

The proposed conservation measures were established on the basis of the following threats:

- modification, fragmentation and loss of habitats (including grassland), following agricultural activity and changing of land use;
- contamination by agricultural products;
- disturbance caused by other anthropogenic activities.

Due to the status of vulnerable/threatened species (being included in the European Red List [18]), at the level of all EU Member States, implicitly Romania, several conservation measures have been put in place to restore/maintain the favourable conservation status, measures based on the following threats to the species *Falco vespertinus*:

- modification, loss and degradation of grassland habitats;
- disturbances caused by forestry activities;
- pollution;
- illegal use of poisons;
- hunting activities near the nesting sites;
- disturbances caused by anthropogenic activities;
- alteration of trophic resources.

Consequently, the following conservation measures are required for the conservation and protection of *Falco vespertinus*:

- prohibition of activities that cause alteration of habitat, feeding and resting of the species;
- prohibition of urban projects in the habitats important for the species;

- avoiding the use of strong insecticides and herbicides as well as agricultural treatments that cause poisoning of birds;
- maintaining a mosaic landscape, including the presence of trees and shrubs;
- maintaining corridors between grassland areas, which also include trees or groups of trees;
- prohibition of the burning of grassland;
- harmonization of the agricultural calendar with the biology of the species;
- the protection of the colonies of rooks (*Corvus frugilegus*);
- prohibition of hunting in nesting areas;
- prohibition of illegal capture of birds and destruction of nests;
- ensuring peace in the agglomeration areas of the species;
- prohibition of the construction of wind power plants in the areas of breeding, agglomeration, and feeding;
- inventory of current and potential breeding areas;
- identification of important migration, feeding and agglomeration areas for *Falco vespertinus*, including areas important for species conservation;
- dissemination of the studies on species biology and demographic parameters.

The grassland management measures, in order to improve the conservation status of the species and the habitats of *Lanius minor* and *Falco vespertinus*, are constituted in the conservation objectives of the management plan of the avifaunistic protection area ROSPA0029 „Defileul Mureșului inferior și dealurile Lipovei" [30] and the Natura 2000 site ROSCI0355 superimposed over it in the NE part of the study area, in ATU Margina (Figure 6).

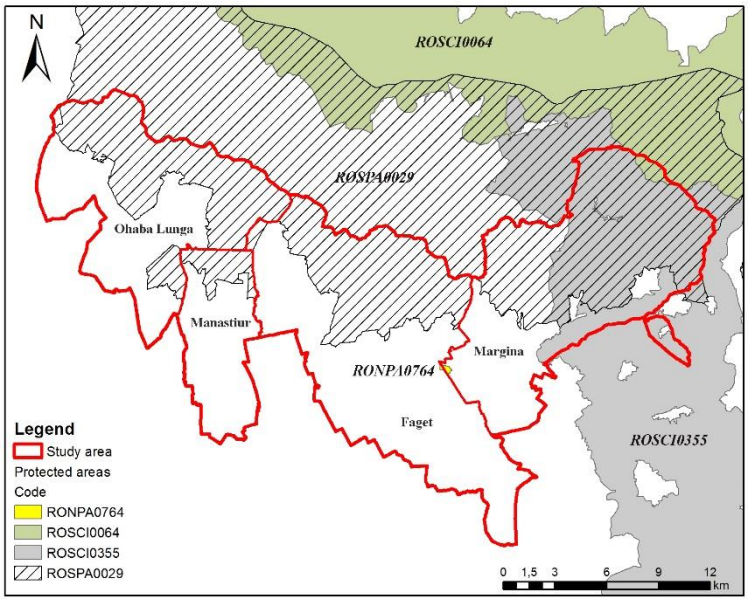


Figure 6. Protected areas in the study region
(processing after Arviha Agenţiei Naţionale de Cadastru şi Publicitate Imobiliară, Ministerul Mediului, Limitele ariilor naturale protejate)

The role of small farms and land owners in the analyzed area is important in the conservation of the two bird species *Lanius minor* and *Falco vespertinus.* Direct economic incentives for the grasslands important for birds can compensate for the losses of forage harvest.

CONCLUSIONS

According to the statistical calculations, the grassland surface of the study area totals 11292 ha, which represents 26% of the total area.

By analyzing the spatio-temporal evolution of the grassland surfaces, the tendency of slight increase by the year of 1995 was demonstrated, followed by a slight reduction until the end of the analyzed period. The recorded variations are explained by the socio-economic "fluctuations" produced in time and space. The more intense use of agricultural land, at the beginning of the analyzed period, under the conditions of a favorable demographic "climate", was followed by the abandonment of the agricultural field and implicitly the beginning of the phenomena of deppreciation of the pastoral environment, with the installation of the demographic decline (produced by the aging of the population and the emigration of young people towards a more "comfortable" environment, urban and with easy and well-paid working conditions).

For the "revitalization" of local agriculture and for the conservation of biodiversity, the EU CAP policies, implemented in Romania by the PNDR (2014-2020) through the agri-environment and climate measure, the package “Important grasslands for birds”, stimulate through the measures of "good practices" in the grasslands analyzed.

As a result of the threats of the bird species *Lanius minor* and *Falco vespertinus*, in order to protect and conserve them, a set of measures of general and also habitat-specific nature has been proposed. The efficiency and effectiveness of the actions will ultimately depend on the degree in which they align to an integrated and coordinated strategy.

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