

# **MONITORING PROGRAMME for RED-BACKED SHRIKE *Lanius collurio***

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## **Range**

The Red-backed Shrike breeds from Europe to west Siberia, and winters in southern and eastern Africa. It prefers dry, sunny areas of open, scrubby habitat. Between a quarter and half (25-49%) of the global breeding range is confined to Europe, extending from southern Fennoscandia to the northern Mediterranean. The European breeding population is estimated at 6.3 to 13.0 million breeding pairs (BirdLife International 2013). Three subspecies are recognised (del Hoyo et al. 2008), two of them breeding in Europe. The nominate *Lanius collurio collurio* breeds in Croatia.

## **Distribution in Croatia**

The Red-backed Shrike is a widely distributed and common species in suitable open and semi-open habitats in the whole of Croatia. It inhabits the lowland, Dinaric and Mediterranean regions, including islands. The Croatian breeding population has been estimated at 300,000 – 500,000 pairs, although validation of the estimation is needed. There is no evidence of any significant change in the species's distribution during last two centuries (Kralj 1997).

## **Habitat**

Inhabits a variety of semi-open habitats of short grass with scattered or open growth of bushes, shrubs, hedges or low trees (1 - 3 m tall) providing perches. It also inhabits scrubby forest clearings and mosaic rural habitats, including orchards, olive-groves, vineyards, hedges, and areas near agricultural roads. It prefers areas of very short grass or bare ground with perches. Habitat types used according to the National Habitat Classification: C1-C5, D1-D4, I1, I2, I5, I7, I8.

It feeds mainly on insects, especially beetles, but also small mammals, birds and reptiles. In autumn it also takes berries. The nest is mostly situated low (on average 1-1.5 m high) in (often thorny) bushes and hedges, (hawthorn, blackthorn, dog-rose, bramble etc.)

## **Phenology and population biology**

The Red-backed Shrike is migratory species. Pre-breeding migration lasts from late March to May, and breeding from May to July. Post-breeding migration lasts from late July to October, while the species is present on its wintering areas from October to March. It is regularly present in Croatia from May to September. Annual fluctuations of breeding population size are noted in Croatia, but no detailed study has been conducted about their causes.

## **Pressures and threats**

According to the reference list of threats and pressures for reporting on Article 12 of the Birds Directive, the main pressures are: loss and fragmentation of habitats resulting from agricultural intensification (A02.01) and change of crops (A02.03) on one hand and abandonment of low-intensity

agriculture (for example loss of hay-meadows) (A04.03) and afforestation (B01) on the other. Increased use of pesticides (A07) causes reduction of food resources or even direct poisoning. Intensive use of fertilizers (A08) causes dense growth of the vegetation, and decreases the accessibility of prey. However, the intensity of these pressures are not so high as to cause a significant and widespread population decrease in Croatia. The abandonment of traditional agriculture (A10) occurs in areas with lower human population densities (for example in Dinaric region), while it is expected that intensification of agriculture in the lowlands will follow Croatian accession to the EU (A06.03).

Apart from pressures on the breeding grounds, the Red-backed Shrike, as a long-distance migrant, is affected by habitat change, weather conditions (for example, prolonged periods of drought) and other threats (for example illegal killing in the Mediterranean) along the flyway and in its wintering grounds (X0, XE).

## **Conservation measures**

### Needed measures

It is important to preserve mosaic agricultural habitats and traditional agricultural practices. In large agricultural areas, marginal habitat features (hedges, trees, ditches) should be maintained. Suitable vegetation structure should be ensured through reduction of fertiliser use and avoidance of re-seeding with fast-growing grass mixes. Food resources should be protected by the avoidance of pesticide use.

The Red-backed Shrike is fully protected under the Nature Protection Act (OG 70/05). It is a target species in 35 proposed SPAs, while the proposed NATURA 2000 network in Croatia covers 47.2% of its national population.

### Annexes of the Birds Directive

Annex I

### Croatian Red List

Least Concern (LC)

## **Monitoring Programme**

The Red-backed Shrike is widespread in suitable open and semi-open habitats, with a relatively well-known range and habitat preferences. Therefore, counting in plots is the most appropriate monitoring method, with some additional research needed to measure detectability in different habitat types. The distance sampling method should be used to correct the field counts order to give a better estimation of densities and trends.

It is possible to combine monitoring of the Red-backed Shrike with monitoring of other species of agricultural areas, and with Common Bird Monitoring. For the first stage, apart from the Red-backed Shrike, five common bird species of agricultural habitats have been chosen: Kestrel *Falco tinnunculus*, Hoopoe *Upopa epops*, Crested Lark *Galerida cristata*, Lesser Grey Shrike *Lanius minor* (Annex I) and Yellowhammer *Emberiza citrinella*. The same methodology can also be applied for the site-based monitoring in SPAs.

Training of fieldworkers should be developed by the National Monitoring Coordinator, verified by the Working Group and organised by the Working Group coordinator.

Permits are needed for monitoring in National and Nature Parks.

## **Monitoring on plots**

### Objectives

To employ plot-based monitoring to undertake repeated counts in order to build up a picture of the population trend of Red-backed Shrikes at sites and across the entire country. The planned monitoring can be expanded to cover a number of other species covered if enough resources (experienced fieldworkers and funds) become available. The results will estimate the number of pairs per unit area in different habitat types.

### Fieldwork instructions

Fieldworkers should have skills in bird identification, including by hearing songs and calls. They should be able to recognise target species easily, without additional checking of the field guides and/or song recordings, so they can concentrate fully on the presence and movements of birds in the plot. Fieldworkers should also have a basic knowledge of plant species, in order to determine the tree/bush species used as perches or for nesting. They should be familiar with the use of GPS personal navigators and able to digitise their own field data in an appropriate manner (using MS Excel).

### Detailed instructions

Each census plot has to be checked twice in the season: between 15<sup>th</sup> and 30<sup>th</sup> May and between 1<sup>th</sup> and 15<sup>th</sup> June, with at least 10 days between the two counts. Counts can be done throughout the day with the exception of the hottest mid-day hours. Days without strong wind and precipitation should be chosen.

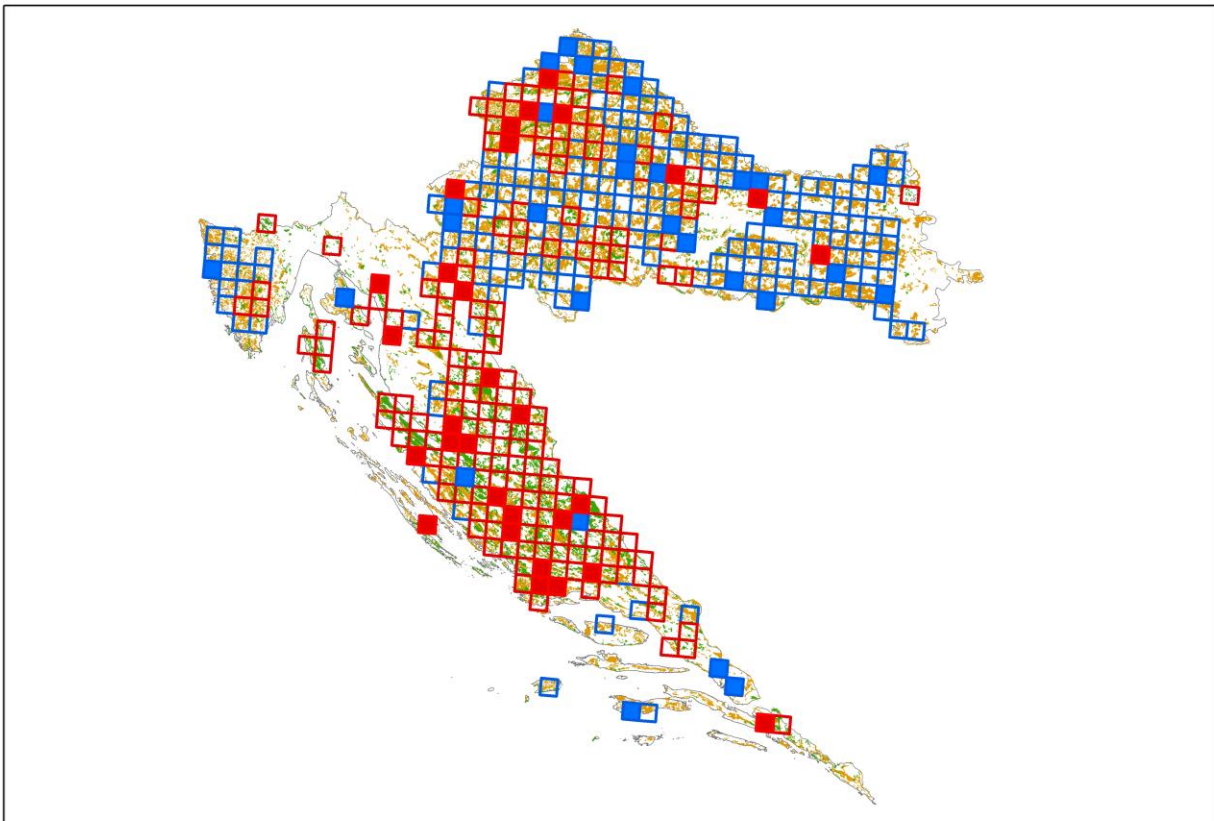
Point-transect counts method will be applied. Transects should be randomly positioned, while points are regularly distributed along the transect, at every 300 m. Each point is predefined and GPS marked. Each counting point should also be marked in the field (for example with coloured tape).

The counting method follows Voříšek et al. (2008). Counting at each point should last 5 minutes with a 1 minute settling period prior to the counting period. Two fixed-distance bands of 0-30m and 30-100m should be applied, with birds beyond 100m and overflyers also recorded. It is recommended to establish markers around the counting point (at distances of 30 and 100 m) to facilitate correct assessment of distance bands. Birds flushed when approaching a census point should be recorded and included in the totals for that point. In general, singing males should be counted (and interpreted as a breeding pair), but observed pairs (male and female) or an active nest or group of recently fledged young are also interpreted as a breeding pair.

At each sampling point, the habitat type should be noted and four photos (four main compass directions) taken. They should be used to verify the determination of the forest type and to indicate any habitat changes between years.

## Sampling design

Over the next six-year period, bird species of agricultural habitats will be monitored during the first three years. Point-transects will be selected by stratified selection. Stratification is based on the Corine Landscape Cover (CLC). Seven categories contain suitable habitats: 221, 222, 223, 231, 242, 243 and 321. However, mosaic habitats (242 & 243) also include patches of other landscape types: vineyards (221), orchards (222) and olive-groves (223), therefore we merged with mosaic habitats all listed CLC categories, with the exception of natural grasslands (321). Grid-cells with more than 25% coverage of merged mosaic habitats (283 grid-cells) and those with more than 10% coverage of natural grasslands (197 grid-cells) were considered as appropriate for monitoring. From these, a total of 60 grid-cells (30 in each strata) were chosen at random (Figure 1). This number was agreed as a representative sample size (according to the total number of cells in Croatia) with Dan Hulea, international bird monitoring expert in the ManMon project.



**Figure 1: Selected 10x10 km<sup>2</sup> square grid cells for Red-backed shrike monitoring**

- red outline squares - 10x10 km<sup>2</sup> grid squares more than 10% coverage of the natural grasslands (N = 197),
- red squares - sample of randomly selected grassland squares (N = 30)
- blue outline squares - 10x10 km<sup>2</sup> grid squares more than 25% coverage of mosaic habitats (N = 283)
- blue squares - sample of randomly selected squares with mosaic habitats (N = 30)

In each grid-cell, two transects with 8 points each (total length 2 x 2100 m) should be established. The beginning of the each point-transect should be situated in randomly chosen 1x1 km quadrats covered with more than 25% of suitable habitat. The point-transect can follow small agricultural roads

and paths, but should not follow main roads (to avoid disturbance affecting both birds and the observer). Both point-transects can be done in a single morning, with the order of count alternated between two visits (i.e. the transect counted first during the first visit should be counted second during the second visit). To cover 60 point-transects, 150 man-days per year are needed. The first year is a pilot year for the full scheme, after which methodology or organisation of point-transects can be changed accordingly.

### Data forms

The data form is attached as a separate document. For each point-transect it is necessary to prepare orthophoto maps showing the transect route, each sampling point and the distance bands. Data should be archived in a database containing: code number of 10x10 km square, code number of the counting point, coordinates of each counting point, fieldworker name, habitat type (including photos), field count number (1st or 2nd), date, time, number of breeding pairs of each counted species per point (for each belt separately). An Excel file with the proposed database layout is attached. Fieldworkers should digitise their data and send them together with a paper copy for quality control.

## **Scientific research**

### Objectives

Scientific research is planned to measure Red-backed Shrike detectability, which depends on method, observer and habitat. The results will be used to correct the counts and give better estimates of population densities and trends.

### Framework assignment

Detectability should be measured by the distance sampling method (Buckland et al. 1993), the most efficient method of estimating bird density from field data (Voříšek et al. 2008). It takes account of the fact that the number of birds observed declines with distance from the observer. Distance sampling models the distance function and estimates density taking into account not only the birds that were observed, but also those that were likely to be present but were not detected. Data for distance sampling method will be collected through the regular transect monitoring, but at least eight plots (10x10 km grid cell, two in lowland and six in montane forests), will be studied more intensively (4 times per season) in order to collect enough data for measurement of detectability. It will take an additional 20 man-days. The study should be done by the Institute of Ornithology, CASA.

## **Evaluation of the conservation status components**

### Population size

Population units are breeding pairs. One singing male or a male holding territory (perched) or a pair (male and female) or group of recently fledged young are interpreted as a breeding pair.

The proposed monitoring will provide information about relative changes in the population size (percentage of increase or decrease per year), as an index of the population, not the absolute number of breeding pairs. For a widespread species like the Red-backed Shrike, it is impossible to achieve full coverage of the entire country. Therefore birds will be counted in representative sample areas, and the data achieved for each strata (i.e. habitat type: mosaic or grassland) will be corrected for

differences in detectability and extrapolated from them to the amount of suitable habitats in the whole country (using GIS) and finally added to get the national population size. Data collected by this monitoring method cannot be used for determination of population structure.

#### Breeding distribution map and range size

The proposed monitoring is designed in such a way that each sampled plot fits a single 10 x 10 km grid cell. Results from the 60 monitored cells can be extrapolated to other cells with the same habitat type (using GIS and PRESENCE software), while more detailed data about distribution will be obtained through the Natura Investment Project.

#### Main pressures and threats

The proposed monitoring will record changes in population size over time. Such changes can be related to changes in breeding areas or as a result of habitat change, or local climate (including in the wintering areas or along the flyway, as the Red-backed Shrike is a long-distance migrant). Where changes in breeding habitat are related to structural changes of habitat or changes in land-use (for example resulting from agricultural intensification or natural succession after abandonment of an agricultural area), these changes will be recorded (either under "disturbance and threats recorded" on the data form or as seen from photos). However, a fluctuation in numbers can also result from decrease in prey availability (as a result of local weather, pesticide use etc.) which cannot be measured under this monitoring programme. In the case of decreasing numbers, additional studies must be undertaken to identify the underlying reasons and to propose appropriate conservation measures.

#### **References**

- BirdLife International (2013) Species factsheet: *Lanius collurio*. Downloaded from <http://www.birdlife.org> on 24/01/2013. Recommended citation for factsheets for more than one species: BirdLife International (2013) IUCN Red List for birds. Downloaded from <http://www.birdlife.org> on 24/01/2013.
- Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake 1993: Distance Sampling: Estimating Abundance of Biological Populations. Chapman and Hall, London. 446pp.
- del Hoyo J., Elliott, A., Christie, D.A. (eds) 2008 Handbook of the Birds of the World Vol.13. Lynx Edicions, Barcelona.
- Kralj, J. 1997: Croatian Ornithofauna in the last 200 years, *Larus* 47: 1-112.
- Voříšek, P., Klvaňová A., Wotton S., Gregory R. D. (eds.) 2008: A best practice guide for wild bird monitoring schemes. 1<sup>st</sup> edition. CSO/RSPB.