

Mammal and other biodiversity monitoring during common bird monitoring surveys

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Monitoring biodiversity is essential for conservation and management. Bird monitoring schemes are well established in many European countries, and these are producing large amount of information on changes in biodiversity on an annual basis. In Europe national population trends based on common bird monitoring are merged annually through Pan-European Common Bird Monitoring Scheme (PECBMS) of the European Bird Census Council (EBCC) (Brlík et al. 2021). Other taxa than birds, such as fish, butterflies, mammals, amphibians and reptiles, are also monitored in many other countries. However, monitoring of other taxa than birds is often less organised on the European level.

The butterfly monitoring in Europe is very similar to the concept of the PECBMS, where national datasets are gathered through European Butterfly Monitoring Scheme (eBMS) and multi-national population trends as well as multi-species indicators are produced (Butterfly Conservation Europe & the Centre for Ecology & Hydrology 2023). Among mammals, the European Mammal Foundation is coordinating the 2nd European Mammal Atlas (EMMA2), which covers years up to 2023 (European Mammal Foundation 2023), but long-term population abundance information is not regularly collected on European scale. In the aquatic ecosystems, the monitoring data of fish stocks is gathered on European level. However, fish monitoring is typically targeted towards only marine and economically important fish species (European Environmental Agency 2023a). European Union is also collecting information on population trends including amphibians (53 species), reptiles (90), fish (77), arthropods (125), mammals (76) and plant species (677), through the Habitat Directive. However, these only concern species which are listed in Annex II, IV and V and thus this information rarely concerns common species (European Environmental Agency 2023b). Habitat directive reporting information is also restricted to EU countries only.

Although bird monitoring schemes have been developed to survey birds, other taxa are also observed during censuses. Several countries have used this opportunity in recent decades and have asked volunteers to record some other taxa systematically. For instance, the mammal counts in the breeding birds surveys of the UK started in 1995 (Wright et al. 2014). However, the overall situation how mammal or other biodiversity are monitored in European countries along the common bird monitoring surveys is poorly known. To fill this gap in knowledge, EBCC provided a questionnaire to the national coordinators of the common bird monitoring schemes in 2022–2023. This article introduces the results of the questionnaire. Examples how mammal monitoring is conducted in various European countries during the common bird monitoring schemes have been provided in separate articles of this Bird Census News volume (Chodkiewicz et al. 2023, Dijkstra et al. 2023, Hayward 2023, Lehikoinen 2023, Peris-Morente et al. 2023, Vikstrøm & Eskildsen 2023).

The questionnaire

National coordinators were asked to answer questions about systematic data collection on other animal taxa:

1. Do volunteers of your breeding or winter bird surveys collect systematic information on other animal taxa than birds during the bird monitoring (e.g. mammals, amphibians, reptiles)?

If the data is collected, coordinators were asked to provide information on:

- i) scheme and season
- ii) surveyed taxon
- iii) is the survey of these non-bird species voluntary/obligatory?
- iv) do observers collect abundance or occurrence data?
- v) when did the scheme start?
- vi) has distance sampling been conducted?

In addition, the questionnaire included also questions about

2. Do volunteers of your breeding or winter bird surveys collect systematic information on habitat type along the surveys?
3. Do volunteers of your breeding or winter bird surveys collect systematic information on crop size of trees (e.g. rowan berries or cones of conifers)?

Results and discussion

31 countries replied to the questionnaire about the survey of other taxa. Ten of these have also protocol for other taxa than birds in their common bird monitoring scheme (Fig. 1, Table 1). Mammals have been surveyed in all ten countries, although in Switzerland only Red Squirrel *Sciurus vulgaris* has been surveyed. The oldest mammal monitoring schemes are in Denmark (starting in 1984), the Netherlands (1990) and the UK (1995). Three countries used volunteers to monitor amphibians or/and reptiles, but only Alpine Salamander *Salamandra atra* has been surveyed in Switzerland (Table 1). One country (UK) had also butterfly surveys in their BBS sites. In most countries, the monitoring of the other taxa was voluntary and distance sampling was used in five schemes. The mammal monitoring has so far been concentrated in North and West European countries and there is a nice climatic gradient from southwest to northeast. The existing data could be already now used, e.g., for producing large-scale species distribution models. However,

this would require synchronising of the data files, which has been practiced, e.g., in PECBMS.

12 countries out of 27 replying countries reported that they are collecting habitat data from their survey sites. In most of these countries it was obligatory. In addition, one country had collected habitat data earlier through volunteers, but now switched using remote sensing data.

Only one country collected information on crop sizes of trees. Volunteers of the Finnish winter bird counts have an option to report magnitude of the crop size in Rowanberry *Sorbus aucuparia*, Norway Spruce *Picea abies* and Scot's Pine *Pinus sylvestris*. This data has been collected since 1987 and used in several studies, e.g. to connect with the annual variation in bird numbers or timing of migration (Fox et al. 2009, Kanerva et al. 2020, Lindén et al. 2011).

Overall, monitoring of other biodiversity than birds can be possible while doing the common bird surveys, but the target taxa should not cause much additional work for the volunteers. Mammal monitoring could be the easiest option to add new taxa to the monitoring scheme. This surely requires some additions to the national protocols and changes to the national databases systems. Communications with the volunteers is highly important and it is important to listen to their opinions on the new monitoring options. Having the participation voluntary will likely increase the acceptance of the new protocol. It would be delighted to see that the coverage of the mammalian surveys would expand to new countries in the future.

Table 1. National bird monitoring schemes, where other taxa than birds are also surveyed. The taxa, starting year of monitoring scheme, is the scheme obligatory or voluntary and is distance sampling used are shown.

Country	Season (scheme)	Taxon and starting year	Obligatory?	Distance
Denmark	Breeding and winter	Mammals 1984	Obligatory	No
Finland	Breeding	Mammals 2018	Voluntary	Yes
Finland	Winter	Mammals 2014	Voluntary	No
France	Breeding	Mammals 2015	Voluntary	Yes
Netherlands	Breeding	Mammals 1990	Voluntary	No
Norway	Breeding	Mammals 2016	Voluntary	No
Poland	Breeding	Mammals 2005	Voluntary	Yes
Spain	Breeding (three schemes)	Mammals 2005, amphibians, reptiles 2005	Voluntary	Yes
Spain, Catalonia	Breeding and winter	Mammals 2006	Voluntary	Yes
Sweden	Breeding, fixed routs	Mammals 2011	Obligatory	No
Sweden	Breeding, night routes	Mammals 2010, amphibians 2019	Obligatory	No
Switzerland	Breeding	Red Squirrel 1999, Alpine Salamander ~2018	Obligatory	No
UK	Breeding	Mammals 1995, butterflies 2009	Voluntary	No

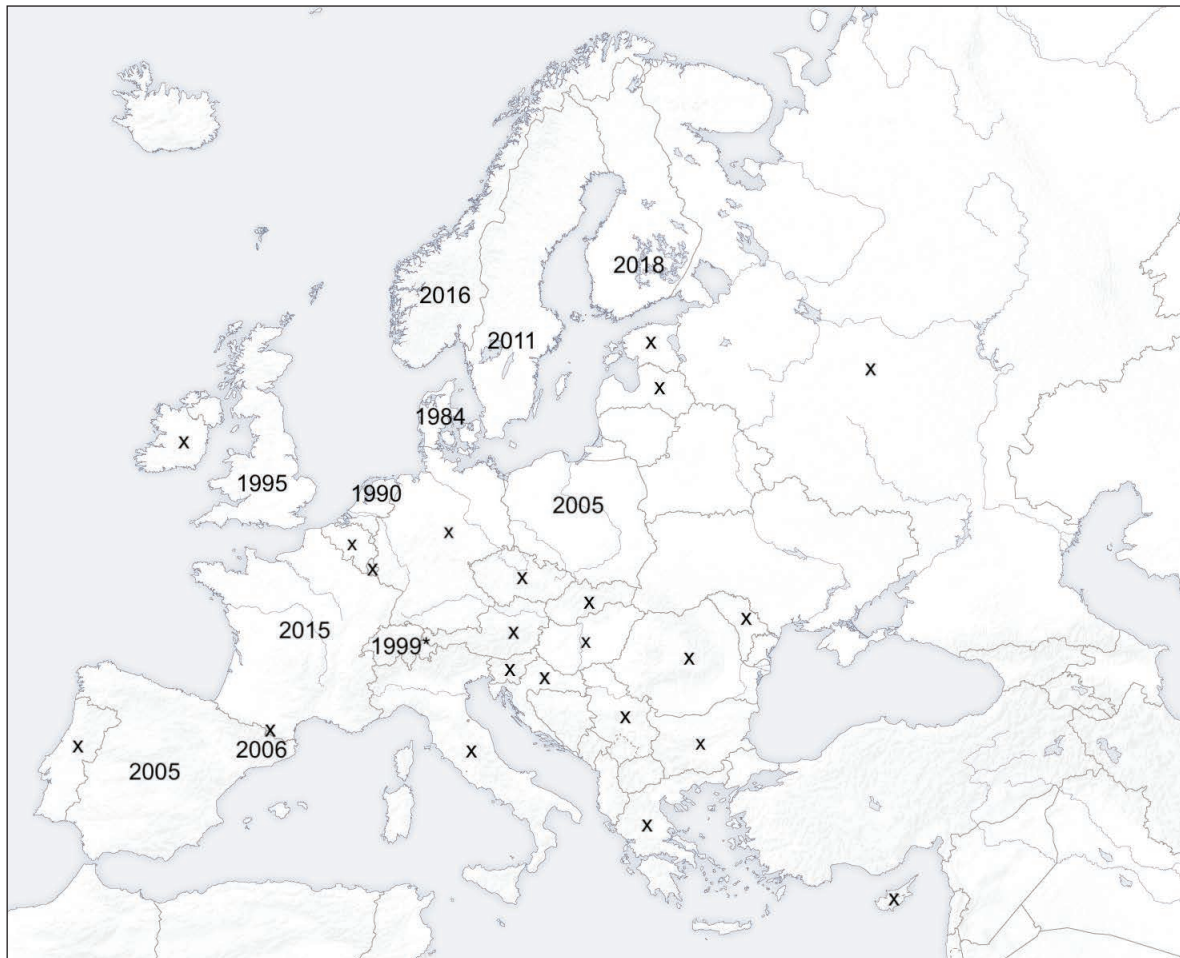


Figure 1. European countries, which have national common bird monitoring scheme and answered to the questionnaire about surveys of other taxa than birds. The years on the map are showing the starting year of the mammal monitoring in the country and 'x' means that the country currently does not have mammals included in the common bird monitoring protocol.

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