

General Instructions

The following sections are included in the instructions of each monitoring project: background and aims, equipment and time needed, choosing of study area, study period, time of day, weather, methods for field work, interpretation of results, filling of forms and repeating the study the following year. Part of the projects have also some additional instructions. At the end a selected bibliography lists the most important methodological papers used in preparing the present instructions as well as recent reports of the projects at the national level. A more comprehensive bibliography as well as grounds for the selection of the methods and their applications can be found from Møller (1983) and Koskimies (1987, 1989).

Usage of forms has been clarified by enclosing model forms which show things worth noticing when filling in the forms. In the text the forms are referred to by using a code labelled in their upper left corner. The code consists of the number of the project and a letter showing the respective page of the form.

How to participate in monitoring?

Anyone with adequate skill in bird identification and ability to follow instructions in detail can participate in bird monitoring. In most cases a prerequisite for participating is also a good knowledge of bird calls and songs. This does not necessarily mean that all the breeding birds in Finland should be known very well – an observer is able to participate in raptor or nest-box studies, or in night-singing birds census, for example, when he/she is able to identify the bird species included in these projects. No test for the candidates will be arranged; each censuser is responsible for the reliability of his or her results.

In most projects one needs, besides the instructions and forms, binoculars, notebook, and a survey map (e.g., 1:20 000). A telescope is useful e.g. when censusing waterfowl. The projects on box-nesting birds, raptors and night-singers are completed by ringing, but there is no reason why other observers than ringers could not participate as well. In fact these projects as well as archipelago birds census succeed best if bird ringers and other observers co-operate.

Each person participating in any study will receive a personal observer number from the Museum. Instructions and forms for censuses in the next year as well as summaries about the results of the censuses of the previous year are sent to each observer. However, there is no possibility to give compensation for possible expenses or to pay a salary, because bird monitoring is based on voluntary work due to limited funding.

Instructions and forms

There are special instructions and forms for each project. The instructions are written in detail so that one can both carry out the field work and fill in the forms without other aids. One should learn the instructions thoroughly before going into the field. The instructions have to be followed precisely in order to make the data reliable and valid for comparison. One should also study the forms carefully beforehand so as to be able to collect and write down all the essential information in the field. Each point should be filled in clearly in order to avoid any confusion. Numbers and abbreviations of the data sheets should be coded carefully, because the data are not necessarily written in files by an ornithologist; even crude errors may be left unnoticed. The forms are filled in with clear hand-writing, in pencil and in BLOCK LETTERS. Write only one number or letter in each space within a data box. All numbers (except national grid coordinates) are always written so that they end at the right margin of the box. All data with letters are started from the left margin. Boxes with a black corner are left empty (they are filled in at the Museum). It is advisable to fill in the forms right after having finished the field work in order to avoid anything being left out because of deficient notes or forgetting! One should save copies of all the forms that will be sent to the Museum! From the copies one may e.g. check codes that remain the same from year to year.

Instructions and forms may be ordered by phone or by letter from the Museum. When ordering large quantities, please use the material ordering form, which is available on request. The Museum also sends envelopes in which

participants can return the forms without postage.

Return the forms as soon as possible after finishing the field work! Coding, storing, editing and analyzing of the data take a lot of time. Both the observers and the responsible environmental authorities receive the results quicker, if the field data is sent to the Museum in time.

Results of the waterfowl census should be returned before mid-June. Data are used already the same summer, e.g. for making hunting recommendations. Almost all other monitoring forms should be returned before the end of August. Threatened birds register forms and winter bird census forms make two clear exceptions: the former are returned before the end of the year, and the latter within two weeks after a census day. Bird site register forms should be mailed before the end of September. The address where to send the forms is at the beginning of each instruction.

Observer number

A personal observer number is used in all the studies of the Zoological Museum. Observer numbers were taken into use for the Bird Atlas in 1986 and they are valid also in other projects. Ringers use the number of their ringing licence as an observer number. If one does not already have an observer number, one may ask for it from the Museum before returning any forms. Otherwise the forms may also be returned with one's full name written on them and the Museum will give an observer number before the next field season. For safety it is recommended that one always writes the initials of one's name beside the observer number, if the whole name is not asked for in the form (as in the Nest Record Card).

Bird species

The standard 3+3-letter codes of the breeding birds in Finland are used in all the projects. Appendix 1 lists 427 bird species breeding in Europe (marginal species excluded). In forming the codes we have followed the guidelines suggested by Busse & Kania (1989). In Finland, as in any other part of Europe, however, it is not possible to observe all the species listed in Appendix 1 within monitoring projects. The basic versions of the codes are applicable in national use, if the possibility of a mistake between two codes – now presented as exceptions in Appen-

dix 1 – is small. In Finland, for example, we use LARMIN (instead of LARNUT given in Appendix 1) for the Little Gull *Larus minutus*, because the Lesser Grey Shrike *Lanius minor* (LANNOR) does not breed here. Other examples of Finnish applications can be seen in the forms in this Manual.

The collective species "LOXSP." is used when reporting unidentified Crossbills. The taxonomy follows Voous (1977), except for the Arctic Redpoll, which is named *Carduelis exilis* (*C. hornemanni* breeds in Greenland). Molau (1985) has shown that Redpoll and Arctic Redpoll are separate species, which interbreed very little or not at all.

Municipalities

The name of the municipality is asked, because with its help data may be filed according to the municipality and local ornithological societies. Possible errors in coding and storing of the national grid coordinates can be checked by comparing with the municipality. Their names are written in the forms using 6-letter codes. The municipality codes of Appendix 2 are fixed to the year 1986; although some municipalities have been united since then, the original names will be used in the forms. If a point count route, for example, runs through several municipalities, use the code of the most important one (the municipality where the majority of census points are situated).

National grid coordinates

In all projects study areas are located by using the national grid coordinates of Finland (Heikinheimo & Raatikainen 1981). These have been marked on the survey maps (scales 1:20 000 and 1:50 000) with red lines. Do not confuse these with the coordinates of latitudes and longitudes, which are marked in black. If one has problems with coordinates or maps in general, ask the Museum or a local ornithological society for help. Crude errors can be avoided by comparing the coordinates estimated for a study area with those of the national grid map of Finland (Appendix 5), the atlas grid map on the back cover of the Manual, and the coordinates of the municipalities (Appendix 2).

The coordinates are marked in the margins of maps with intervals of one kilometre. For each 1 | 1 km square one uses the coordinates of its southwest corner. They should be written on

the forms in the following way: the north coordinate (horizontal lines) with four numbers, and after it the east coordinate (vertical lines) with three numbers. Example: the 1)1 km square containing the castle of Hämeenlinna is marked 6768:362. If a map has been printed in the 1980s, also the east coordinates are written with four numbers, the first of which is 3. The number three is the symbol of the national grid coordinate system and it should not be written on the forms. In older maps the east coordinates are written without the symbol using only three numbers.

One needs the national grid coordinates with an accuracy of 1)1 km when filling in e.g. Nest Record Cards. Raptor nests are reported even more accurately: with the help of a map of the scale 1:20 000 one will be able to calculate squares of 100)100 m by measuring the distance from the nearest north coordinate line towards the north and from the nearest east coordinate towards the east in millimetres, and dividing these figures by five. The resulting number is written in (without rounding) as the fifth digit to the north coordinate and as the fourth digit to the east coordinate. For example, the castle of Hämeenlinna in the 100)100 m square is 67687:3627.

In different monitoring projects the location of a study area or a route is usually reported with an accuracy of 10)10 km (bird atlas square). In the above example of Hämeenlinna, the atlas square would be 676:36. Thus, the last number giving the accuracy of 1)1 km is left out from both the north and the east coordinate. If the study area is located in more than one 10-km square, mark the most important grid (e.g. the one with most census sites or nestboxes).

The following example shows how the municipality codes of Appendix 2 may be used to find possible errors in national grid coordinates. In the list the coordinates of the central point of the town of Hämeenlinna are 6768:362 and the radius is 15 km. This means that the area of the town lies within a radius of 15 km from the center point. If one estimates 6764:362 as coordinates of the southeast shore of Hattelmala lake, the lake should locate in the town area of Hämeenlinna, because neither of the coordinates are further than 15 km from the center point. The lake could not be in the square 6764:336, because the checking of the east coordinate (362-336 = 26 km) results in more

than 15 km. (In this case the error was caused by taking the symbol of the national grid (3) as the first number of the east coordinate.)

Habitats

Standardizing habitats is essential for the study of changes in the environment or in bird populations. The details of the classification are included in the instructions of each project (see also Mikola 1982, Lahti & Väisänen 1987).

When evaluating habitats in a study area or around a nest one does not have to be an expert in botany. For purposes of bird monitoring rough classification by eye is sufficient. It has to be done carefully, however, in order to make the categories comparable between different years, observers and areas. Therefore the observer has to decide his or her habitat criteria before participating in any project and to use the same standard every year. If the habitat changes to another one, this should be reported – one of the main goals in monitoring is to study the relationship between birds and environments and the changes in them.

Co-operation is powerful!

Monitoring should be continuous and comparable in the same areas from year to year. The best way to fulfil this basic requirement is to work as a group, the members of a local ornithological society or other birdwatchers monitoring as many aspects of their area as possible. If there is a risk that a project will be discontinued, it is easier to find a successor from a familiar group.

A net of local study areas would be an ideal arrangement for monitoring birds. In each area there would be enough coverage to keep the data representative and statistically valid. Projects would be integrated so that results could be compared and combined in as many ways as possible. Monitoring should cover all major habitats of the region. A suitable center for activity would be an inland bird station, a standard mist-netting site or a nest-box area, and a few active field ornithologists, part of them ringers, would take the responsibility of field work. Each project should have a person responsible for it; he/she takes care that the local projects continue and have proper equipment, sends the results to the Museum, and asks for information from the data bank of the Museum for making comparisons when necessary. In an

optimal case several such groups would work within the area of a local ornithological society.

If institutes organizing monitoring projects will be able to finance part of the field work in the future, the support will be given to those groups which work systematically. Already at present it would be worth presenting the idea of inventories in valuable bird sites for conservation purposes to municipality leaders. At least a part of the inventories could be repeated annually, forming the framework of the local monitoring system.

References

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