4a Waterfowl Point Count

Zoological Museum, Finnish Museum of Natural History
Finnish Game and Fisheries Research Institute, Game Division
Waterfowl census / Zoological Museum
P. Rautatiekatu 13
SF-00100 Helsinki

1. BACKGROUND AND AIMS. The point count method was developed to rapidly collect representative samples for the monitoring of regional waterfowl populations (divers, grebes, swans, geese, ducks, gulls, terns and Coot). The basic aim is to monitor annual and long-term population changes in various types of waters all over Finland, and to investigate the reasons for the changes observed. Waterfowl censuses are important for environmental monitoring, management of breeding waterfowl populations and determination of sustainable hunting levels. The present scheme started in 1986.

2. EQUIPMENT AND TIME NEEDED. Binoculars or a telescope are needed for counting. Mark the counting points and sectors on a survey map (1:20 000). Write down the observations in a notebook or on a census form, or use a portable tape-recorder.

It usually takes 5–15 minutes to count one point, so it is possible to census 20–30 nearby points before midday.

3. CHOOSING A CENSUS ROUTE AND POINTS. A pond, lake, bay, sea-shore or river can be censused. To confirm the representativeness of the data it is desirable that all types of water bodies be censused in your region.

Plan a census route within the boundaries of a 10x10 km square (national grid) with the help of a map and field knowledge. Each route should consist of 1–10 (or more) easily reachable counting points, preferably dispersed over several water bodies. The counting points should meet the following criteria:

- One should be able to limit the counting sector with the help of permanent land marks (e.g. island, peninsula, skerry, buoy, building). Mark down the limits of the counting sector on your map and notebook.
- There must be an unobstructed view over the counting sector. Probable annual differences in vegetation or in light and wind conditions should not reduce the comparability of the results.
- One should always be able to identify the bird species with binoculars or a telescope even at the furthest end of the sector (in practice within a distance of 1 km). The size of the counting sector is thus determined so that one is able to identify all the birds within it.
- One should be able to reach the counting point even during the break-up of ice or flood.

The most suitable counting points are tips of peninsulas, rocks on the shore, observation towers or wharfs. It is easy to count large sectors when the sun is behind your back (place the counting points on eastern or southern shores if possible).

Within the same water body there can be one or more counting points, the sectors of which are clearly separate.

Experienced observers can choose their counting points so that the sectors are adjacent to each other and thus possibly cover the whole lake. The sectors should not intersect in this case either. – Send the Museum a copy of a map showing your counting points and sectors after the first census year.

4. CENSUS PERIODS. Count the same water body from the same points every year (1–) 2 times in late spring; the exact time depends on the breeding waterfowl fauna of the particular water. The first count should take place during the first half of May and the second count at the end of May or the beginning of June (see Form 4C). If the breeding species include only Mallards, Teals, Goldeneyes, Pochards and/or Goosanders, one count during the first half of May is enough. If, in addition to these species, several pairs of Garganeys, Wigeons, Tufted Ducks and/or Red-breasted Mergansers also breed in the census area, a second count is re-

quired at the end of May or the beginning of June. Pintail and Shoveler can be counted reliably either during the first or second period, depending on the location and the type of water body (see instructions for waterfowl round counts in Ch. 4b in this Manual). It is recommended, however, that both counts are made in every census area, because it is difficult to know the breeding bird fauna beforehand. In practice, one count is enough in oligotrophic waters (preferably at the end of the first period or a little later), but in all other water types two counts are necessary. The counting points along the same route can be censused during several days, but all points of a single water body should be censused during the same day (see Sect. 7).

The census should coincide with the short period when the breeding population has settled but the pair bonds have not yet broken. On the other hand, care should be taken that migrating birds do not bias the censuses (no transient flocks left). The timing of the best census period depends on the geographical location of the census area, advancement of the spring, the type of water body and the species of breeding waterfowl. The core period is best to define locally on the basis of the breaking up of the ice, migration of waterfowl and the flocking of males.

5. TIME OF DAY. Count the birds in the morning or before noon (ca. 6 a.m. to 1 p.m.), but not in the evening. Early morning is usually the best time as regards wind and light conditions and activity of birds.

6. WEATHER. Count the birds only in good weather: a sunny or lightly clouded day is best. Do not count in mist or rain with poor visibility or in windy conditions.

7. FIELD WORK. Walk to the counting point without disturbing the birds. If a bird disturbed by you takes flight from the sector, it is included in the results. Write down in your notebook the name of the water body and the counting point, weather, observer, date and the starting time (with an accuracy of one minute). The procedure is easier and faster if another person writes down the observations while the other watches for birds.

Count the birds from the predefined sector (the whole water area visible to the point or a part of it determined by land marks), with binoculars or a telescope. Proceed carefully in one direction. Be sure not to miss diving birds. Look carefully for birds near the shore and at the edge of vegetation. Identify the species and sex (in species where sexing is possible) and write down the individuals and groups while observing. On reaching the other end of the sector, glance quickly at the edges of the vision field of the binoculars or telescope and check the water area nearest to the counting point, taking care not to recount any earlier individuals. Write down the time you stopped observing (with one minute's accuracy).

Different individuals, pairs, groups and flocks are written down separately (Form 4D). Pay attention to individuals swimming or flying in a definite direction. If a bird leaves or enters the sector during counting, include it in the results. Neither birds circling over the sector without alighting (e.g. so-called pursuit groups) or flying straight over, nor those migrating or breeding elsewhere (e.g. a dense group or a flock in open water, usually far from the shore) are interpreted as pairs of the sector. They should, however, be written down on Form 4D.

The time needed for counting varies depending on several factors, e.g. the size of the sector, shape of the shore line, vegetation and the number of birds. Do not hurry while counting, but do not spend more time than necessary either (birds may move around). The time spent in counting is asked for so as to ensure that it remains approximately constant from year to year. If an individual bird cannot be identified within a few minutes, try again after the actual counting period. If still unsuccessful, mark it down on Form 4D under "remarks". Other observations made after the main period are not taken into account.

If there are several nearby counting points along the same water body (pond, lake, bay) or if the sectors are adjacent to each other, count all these points in succession during the same morning fairly quickly. Make notes of birds moving from one sector to another as well as those flying over and possibly alighting, so as far as possible to avoid counting the same individuals repeatedly.

8. INTERPRETING OBSERVATIONS. The unit analysed is a pair, not an individual. Interpret the observations written on Form 4D as

pair numbers according to the instructions in Form 4A.

9. FILLING IN THE FORMS. The information about the census route is given on Waterfowl Route Form 4A and the census results point by point on Waterfowl Site Forms 4C–D. The instructions for filling in the forms can be found overleaf on the route form (page 4B). Send the route form and all its site forms together. Also, include a map showing the counting points and sectors after the first year.

10. REPEATING THE CENSUS. Count the same points during as many successive years as possible (at least two). To ensure the comparability of the results, make the censuses exactly the same way each year:

- exactly the same counting points and sectors
- the same observer
- good weather
- in each point use the same time of the year in relation to the advancement of spring and migration during both the first and the second census periods (in practice the census dates can differ by a couple of days between the years)
- the same practice in field work: the same counting order of the points (if there are more than one along the same water body), the same direction of observing, the use of binoculars/telescope and an assistant. The time of day can vary by two or three hours. If the counting practice changes markedly, it should be mentioned in Route Form 4A and in "remarks" of Site Form 4D. In such a case the point is taken to be a new one.

11. POINT COUNTS OF SHORE BIRDS. Those eager enough can also count the shore birds from the same counting points as the waterfowl. This contributes significantly to the monitoring data on certain waders and passerines breeding along shores (wetlands, shore meadows and scrub, silty shores etc.; shore forests and fields are not included, see Form 4D). The species to be counted during the first census period of waterfowl are Snipe and Reed Bunting, and during the second period Redshank, Common Sandpiper and Sedge Warbler (the territories are written down on Form 4D in both periods, but the pair numbers are primarily estimated from the results of the species-specific periods, see page 4B). Additional species may also be counted if desired. They should be added to the "additional species" (4C–D; write in the "remarks" on 4D, which species were included in the count).

Shore birds are counted after the waterfowl count by listening and observing from the same points for exactly five minutes. The instructions for making point counts of land birds (see Ch. 2 in this Manual) are followed, except that only the birds in the actual shore habitats are included and all the observations are put together independent of the distance. The estimated pair numbers based on territories (usually singing or displaying males or pairs) are written down on Form 4D (putting unlisted species into "additional species").

12. WATERFOWL BROOD COUNT AND LATE SUMMER CENSUSES. The aim of the brood count is to monitor the annual changes in the breeding success of waterfowl (number of broods, proportion of females with young etc.). Brood counts should be done for the same water bodies and counting sectors as the spring censuses of the breeding population. Broods are counted by the same point count method as the breeding population (see Sect. 7). All waterfowl seen are written down separately: lone adults, young and broods with their parents (also the age class of the young). Broods are counted once from about 1 July to 20 July depending on the geographical locality, breeding waterfowl species and the breeding phenology of the year (see also Sect. 4).

Late summer censuses made just before the beginning of the hunting season indicate the status of the hunted waterfowl populations. The size of the population in late summer may differ markedly from that of the early breeding period depending on the type of water (whether it is a moulting or flocking site or whether the birds breeding there move to another water). The summer count should be done once from about 5 to 19 August (hunting begins on 20 August) from exactly the same counting points and sectors as the spring and brood counts. Field work is done as in spring (see Sect. 7) and all individuals and their age classes are written down. Because the number of birds may be high in the very best flocking sites, the counting becomes difficult if birds are disturbed when counting.

Detailed instructions for brood and late summer censuses are available from the Finnish Game and Fisheries Research Institute, Game Division, Turunlinnantie 8, SF-00930 Helsinki, Finland.

Return the waterfowl forms to the Museum as soon as possible (at latest before mid-June)! The results are used the same summer, e.g. for making hunting recommendations. Results of brood counts should be sent immediately after the count.

REFERENCES

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4b Waterfowl Round Count

Zoological Museum, Finnish Museum of Natural History
Kuopio Science Museum
Finnish Game and Fisheries Research Institute, Game Division

Waterfowl census / Zoological Museum
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1. BACKGROUND AND AIMS. Systematic waterfowl censuses on lakes began in Finland in the 1920s and 1930s. Comparable data to the present studies, however, are not available before the 1960s since when the round count method has been used basically in its present manner. The nation-wide monitoring scheme started in 1986.

The principal aim of round counts is to collect data on the population size and abundance of waterfowl over entire water bodies or clearly defined parts of them. The censuses should include representative samples of different water types and geographical areas. Divers, grebes, swans, geese, ducks, gulls, terns and Coot are the main subjects of the counts.

Round count is more time-consuming than point count. Round counts aim at estimating the total breeding populations of a study area, so that the effects of area, eutrophication, vegetation and other environmental factors on waterfowl can be studied. On the other hand, the results obtained from round counts made in successive years can be used in environment-al monitoring.

The following instructions are suited as such to censuses of small and medium-sized lakes, ponds and sea bays. Details for waterfowl and archipelago birds censuses on large lakes are given in Sect. 12.

2. EQUIPMENT AND TIME NEEDED. Besides binoculars, a survey map (1:20 000) and a notebook, an enlarged map showing the most important landmarks and the shape of the shore line is useful when censusing large water bodies with luxurious vegetation and a broken shoreline. If one walks round the water body, a telescope is useful. A boat or a canoe is necessary at least on the largest lakes. It is possible to count ca. 50 ha per hour by boat, even more on large oligotrophic lakes.

3. CHOOSING A CENSUS ROUTE AND AREAS. Ponds, lakes, bays, rivers and also seashores are suitable census areas. To ensure the representativeness of the data, it is desirable that all types of water bodies found in an area (also oligotrophic waters which abound in Finland) are censused.

Plan a census route on a map using field knowledge. Each route should include one or more water bodies which can be censused completely. All water bodies along the route have to lie (at least partly) in the same 10×10 km square of national grid. – Send a map showing your census waters to the Museum after the first census year.

4. CENSUS PERIODS. Count the same water body (1–) 2 times in late spring depending on the breeding waterfowl; the first census should be during the first half of May and the second in late May or early June (see Form 4C). If only Mallards, Teals, Goldeneyes, Pochards and/or Goosanders breed in the census area, one count during the first half of May is enough. If, in addition to these species, several pairs of Garganeys, Wigeons, Tufted Ducks and/or Red-breasted Mergansers breed, another count in late May or early June is needed. Pintail and Shoveler can be censused most reliably either during the first or the second period depending on the geographical area and the type of the water body. Pintail pairs breeding in the north can be observed often on lakes in southern Finland during the first census period. It is recommended that both censuses are made, because it is difficult to know the breeding waterfowl species beforehand. In practice, one count is enough on oligotrophic waters (preferably at the end of the first period or a little later), but elsewhere two counts per season are necessary.

The census should coincide with the short period when the breeding population has settled but pair bonds have not yet broken. On the other hand, migrating birds should not be allowed to bias the censuses (no passing flocks left). The timing of the best census period depends on the geographical location of the census area, advancement of spring, the type of water body and the species of breeding waterfowl. The core period is best to define locally on the basis of the breaking up of the ice, migration of waterfowl and the flocking of males. If males have already formed large circling flocks (more than four individuals), the round counts of that species will no longer be reliable. The censuses should take place during a period favourable to as many species as possible.

Thus, consider carefully the best time for the censuses every year. Pay special attention to the fact that the migrating flocks of the species to be counted should have already disappeared. The most difficult species when two censuses are taken, are the Teal (in late spring the birds still live in flocks during the first count, if it is done too early), Wigeon (non-breeding birds and migrants can make it difficult to define the right census period), Shoveler and Garganey (part of the population is laying eggs while the rest is still settling on territories) and Pintail (migrants can still be seen, especially on eutrophic lakes in southern Finland, during the first census period and even later). When the spring comes late, in northern Finland it is especially difficult to time the censuses right, because both the species to be counted during the first period and those of the second one start their breeding about the same time due to the late break-up of ice.

5. TIME OF DAY. Count the birds in the morning or noon but not in the evening. The birds should not have been disturbed by fishing or other human activities before the census.

6. WEATHER. Count the birds only in good weather: a sunny or lightly clouded day is the best. Do not count in mist or rain with poor visibility or in windy conditions.

7. FIELD WORK. Choose the counting route and direction according to light conditions, vegetation and the resting places preferred by the birds. Start the census in areas where there are few birds and end it where the numbers are highest.

Enter the census area without disturbing the birds. Write down on your notebook the name of the water body censused, weather, observer, date and starting time.

Count the birds by rowing or walking round the entire water body near the shore line. Only small lakes and those with rich vegetation or flooded shores can be censused on foot. Two observers are useful especially when censusing large stretches of water by boat; one rows and observes the movements of birds while the other identifies the species and writes down the data. Use suitable observation sites when counting the (diving) species of open water so that identification is possible before the birds escape.

Carefully study the whole area. Pay special attention to bays, mouths of ditches, edges of reed beds and other places preferred by waterfowl. Check the shores as far as the bush zone when a flood is up. If some part of the study area can be observed reliably with binoculars or a telescope, one does not necessarily have to go there. Coots should be counted from as far away as possible, because they readily hide in vegetation once they spot the observer.

Identify the species and sex (in species where sexing is possible) and write down the individuals and groups while you are observing. Write down the birds according to the following example: Mallard oo + o + oo + o + 3oo +2oo 1o, where o = a single male, 3oo = a group of three males. Write down also the birds in flocks and on migration (e.g. 5oo 3oo, a flock of 10 ind.). These should be mentioned on the form, but they are not accounted for when estimating the numbers of breeding pairs (see Form 4A).

Be especially careful with birds flying or swimming from one place to another: write down the flying directions and sites of alighting. Take care not to count any individual repeatedly. Use enlarged maps on large lakes with rich vegetation and a broken shore line (separate maps for each census period). If nearby areas are censused in succession during the same day, take into account the birds moving from one lake to another (e.g. *Aythya* species). The moving individuals are included in the results of the census area where they finally stay.

Be careful but quick when censusing so as to avoid bias caused by movements of birds.

Despite detailed observations it may occasionally be difficult to decide whether an individual was observed and written down or not. Use common sense when interpreting such cases and follow the same routine from year to year. After returning to the starting point write down the time.

8. INTERPRETING OBSERVATIONS. The unit analysed is a pair, not an individual. Interpret the observations you have written on Form 4D as pair numbers according to the instructions in Form 4A.

9. FILLING IN THE FORMS. The information about the census route is given on Route Form 4A and the census results from separate water bodies on Site Forms 4C–D. The instructions for filling in the forms can be found overleaf on Route Form (page 4B). Send the route form and all its site forms together. In the first census year, include a map showing the census areas also.

10. REPEATING THE CENSUS. Census the same areas during as many successive years as possible (at least two). To ensure the comparability of the results, make the censuses exactly in the same way each year:

- exactly the same census area
- the same observer(s)
- good weather
- in each area use the same time of the year in relation to the advancement of spring and migration during both the first and the second census periods (in practice the census dates can differ by a couple of days between the years)
- the same counting route, direction and speed of movement.

If the counting practice changes markedly, it should be mentioned on Route Form 4A and in "remarks" of Site Form 4D.

11. ROUND COUNTS OF SHORE BIRDS. Shore birds may be censused within the round counts if this does not limit the attention paid to the waterfowl. Such extra data contributes significantly to the monitoring of certain waders and passerines, because shores are their main habitats.

The species to be counted are the waders and passerines listed on Form 4D (only the individuals observed in wetlands, shore meadows and scrub, silty shores etc. are included, not those in shore forests and fields). Additional species may also be counted (the pair numbers are added to "additional species").

If one is not able to cover the whole shore zone from boat or a walking route, define a census belt of certain width and count the birds within it from year to year. In general, the same routine should be followed in shore bird censuses annually to ensure the comparability of results. If it changes, write a note in "remarks" on Form 4D.

12. WATERFOWL AND ARCHIPELAGO BIRDS CENSUSES ON LARGE LAKES. On large lakes the field work should be done as follows (see also the instructions for censusing archipelago birds, Ch. 5 in this Manual):

You need a rowing or a motor boat, a survey map and an enlarged map for visiting. Because the census areas are large, each count takes several hours. A telescope is useful for observing birds further away.

One can census a whole lake or a part of it, which should be a meaningful, separable subarea from the rest of the lake. Shores, peninsulas, mouths of bays, large open water areas, islands etc. are suitable boundaries. The size of the area may vary from a few to tens of square kilometres.

Divide the census area to subareas of different size, based on the characteristics of the shores, vegetation and breeding bird fauna. Put each subarea in one of the following main habitat types:

1) Archipelago with open islets (pelagial waters); typical species include Black-throated Diver, *Mergus* spp., gulls and terns (mark type 1 in Form 4C).

2) Archipelago with forested islands, or forested lake shores; typical species include Goldeneye, Common Sandpiper and Common Gull (mark type 8 and write a short description of the site on Form 4C).

3) Oligotrophic bay; typical species as in type 2 above (mark type 8 and write a short description of the site on Form 4C).

4) Eutrophicated bay; typical species include Great Crested Grebe and Wigeon (mark type 2 on Form 4C).

5) Highly eutrophicated, shallow bay; typical species as in type 4 above, plus many reedbed birds (mark type 4 on Form 4C).

The census area has to be a meaningful entity also as regards field work; i.e. it needs to be workable in one day and in a coherent manner. Valuable breeding sites (islands, peninsulas and bays) should be taken as separate census areas.

The census area is counted once or twice depending on the breeding waterfowl and the time period the observer has available. Besides the phenology of the waterfowl pay attention to the break-up of the ice when determining the annual census period. If most of the species breeding in the area can be counted in the first period (see Sect. 4 and Form 4D), a satisfactory result is obtained in one visit only. In southern Finland the best period is from about 20 May to 25 May and in northern Finland at the turn of May and June. If one concentrates on early-breeding species (see Form 4D) and the Herring Gull (or there are no later-breeding species), one can start ca. five days earlier. A second visit from about 1 to 5 June gives a more reliable result for later-breeding species (e.g. Wigeon, Tufted Duck, Black-throated Diver, grebes, Lesser Black-backed Gull) and is therefore recommended. Be careful not to interpret the late migrants of e.g. Black-throated Diver and Red-breasted Merganser as breeding pairs. A third visit from about 15 June to 20 June is necessary to count the number of terns and late-breeding gulls reliably (especially Lesser Black-backed Gull; if done, write the results in "remarks" on Form 4D. All species and observations are written down on every visit and the pair numbers are estimated according to the observations of the most suitable species-specific census period (see Sect. 4, Forms 4B–D).

The total census area is covered subarea by subarea. Plan beforehand as rapid a route as possible from which one is able to check open water areas, shores and islands thoroughly and carefully. Often it is easiest to first check the mainland shores and after that to go round the islands. All birds are marked on an enlarged map. Pay special attention to the moving of birds to avoid counting the same individuals repeatedly. Check bays and other sites preferred by birds further away with binoculars or a telescope, to avoid disturbance. In general, the birds should be observed before they take flight. Count the incubating gulls and terns before they take off from their nests. If one is not able to count the birds further away because an island under observation is large, stony or has rich vegetation, one should land and count the nests.

The census results of separate subareas are written down separately on Site Forms 4C and the pair numbers are interpreted according to the instructions on Form 4A. The total census area forms a route (see also Form 4B).

The census should be made in the same area in successive years exactly in the same way. To get comparable results, the observer must have experience of waterfowl counting on large lakes already in the first year.

During the waterfowl censuses one can also count the shore birds (see Sect. 11).

13. WATERFOWL BROOD COUNT. The aim of the brood count is to monitor the annual changes in the breeding success of waterfowl (number of broods, proportion of females with young etc.). Brood counting should be done on the same water bodies as the spring censuses of the breeding population. Broods may be counted by the same route count method as the breeding populations (see Sect. 7). All waterfowl seen are written down separately: lone adults, young and broods with their parents (also the age class of the young). Broods are counted once from about 1 to 20 July depending on the geographical locality, breeding waterfowl fauna and the breeding phenology of the year (see also Sect. 4). Pay special attention to shores covered by aquatic vegetation, because duck broods prefer to hide there.

Detailed instructions for the brood and late summer censuses are available from the Finnish Game and Fisheries Research Institute, Game Division, Turunlinnantie 8, SF-00930 Helsinki, Finland.

Return the waterfowl forms to the Museum as soon as possible (at latest before mid-June)!. The results are used the same summer, e.g. for making hunting recommendations. Results of brood counts should be sent immediately after the count.

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WATERFOWL ROUTE FORM **4A** Version III/1990

Waterfowl censuses / Zoological Museum
P. Rautatiekatu 13, SF-00100 Helsinki

Return before mid-June!

ROUTE NUMBER	YEAR	NUMBER OF CENSUS SITES	OBSERVER NUMBER
72	19 90	11	1234

REPEATING THE CENSUS (cross)

- [ ] New route
- [ ] Censused similarly last year
- [x] Census changed, how: SITE 11 IS NEW

Name: _____

Addr.: _____

_____

Tel.: _____

NATIONAL GRID 10x10 km

S - N	W - E
677	41

MUNICIPALITY (6-letter code): HOLLOL

NUMBER OF SITES CENSUSED BY

10	Point count method
1	Round count method

REPRESENTATIVENESS OF THE COUNTED LAKES IN THE RESPECTIVE 10x10 km SQUARE (circle one code):

0 Difficult to estimate
(1) Makes a representative sample
2 Surplus of oligotrophic waters
3 Surplus of eutrophic waters

INTERPRETATION OF CENSUS RESULTS. The following are counted as a breeding pair (field abbreviations in parenthesis):

In ducks (except in *Aythya* and *Bucephala* species)
- single pair (♂♀)
- lone male (♂)
- males in groups of 2-4 (2-4 ♂♂ = 2-4 pairs)
- small male groups chasing a female (2-4 ♂♂ 1♀ = 2-4 pairs)
- lone females (♀), if their total number is larger than that of males (♂).

In the **Tufted Duck** and **Pochard** (excess of males)
- the total number of females (♀♀).

In the **Goldeneye**
- adult male (♂)
- pair (♂♀).

In the **Coot**
- lone bird (near the shore)
- pair (two birds together)
- territorial dispute (= 2 pairs)
- calls of birds unseen.

In **divers** and **grebes**
- lone bird
- pair (= two birds together).

In grebe colonies some birds may hide in vegetation. If you are not able to count all birds (e.g. by disturbing them), give the total number of individuals near the colony without interpreting them as pairs.

In **gulls** and **terns**
- lone bird or pair near a probable nesting site (e.g. incubating or alarmed birds).

The size of colonies can be estimated by counting nests or incubating birds, or parents leaving their nests (both the male and the female are often present). Probable non-breeding groups are not interpreted as pairs.

In **all taxons**
- nest (be careful not to interprete the adults as a second pair!).