

P-06-298

Oskarshamn site investigations

Bird monitoring in Simpevarp 2002–2006

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December 2006

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This report concerns a study which was conducted for SKB. The conclusions and viewpoints presented in the report are those of the author and do not necessarily coincide with those of the client.

Data in SKB's database can be changed for different reasons. Minor changes in SKB's database will not necessarily result in a revised report. Data revisions may also be presented as supplements, available at www.skb.se.

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Abstract

This report is a summary of the monitoring of selected listed breeding bird species in Simpevarp 2002–2006. The aim of the report is to evaluate possible impacts from the ongoing site investigations, conducted by SKB, on the breeding bird fauna. Selected listed species were monitored in the whole regional model area. For most species proper data from most of the area is now available for four years, which means that with one more year of data collection there will be the possibility of analysing the time series statistically.

However, even without statistical testing, most of the results from the bird monitoring are relatively clear. So far it seems as if the site investigations, associated potentially disturbing activities and increased human presence in the area have had very little impact on the breeding birds of selected species. For five of the eight species (honey buzzard, white-tailed eagle, osprey, wryneck and red-backed shrike) no effects what so ever has been registered. All these species show stable or increasing numbers in the regional model area (incl. the local model area) and breeding success seems to be good for species where this has been checked. In part this is due to that no disturbing activities has taken place close to nest sites of these species (true for the involved raptors) but for wrynecks and red-backed shrikes this is more a sign of that these seem to be rather tolerant to increased human presence in their neighbourhoods.

Also for lesser spotted woodpeckers and nightjars there has been no effect on general population size in the regional model area. Both species show an increasing trend over the site investigation period. There seem to be a geographical effect though, where these species avoid areas with the most disturbing parts of the site investigations within the local model area. Some areas used before are now, and has been so during later years, vacant. Eagle owl numbers have also remained stable during the period. Breeding outputs is however lower during the site investigation period compared to before this, and lower than in surrounding reference areas during the same period. The exact relationship between site investigation activities and breeding success of eagle owls is however unknown. In 2006, breeding success was very poor in all areas (both regional model area and reference areas).

Sammanfattning

Denna rapport sammanfattar populationsförändringar och i en del fall häckningsframgång hos ett urval listade (Svenska Rödlistan och/eller EU:s Fågeldirektiv) fågelarter i Simpevarp under perioden 2002 till 2006. Syftet är att utvärdera den eventuella påverkan som SKB:s platsundersökningar kan ha på de häckande fåglarnas numerär och i vissa fall häckningsframgång. Utvalda listade arter har följts upp i hela det Regionala modellområdet (inklusive det lokala området) genom att besöka tidigare kända revir och/eller genom eftersök i lämpliga biotoper för aktuella arter. För de flesta arter som behandlas här finns nu goda data från en fyraårsperiod (2003–2006), vilket innebär att det behövs ett års ytterligare data för att kunna analysera tidserien statistiskt.

Även utan statistisk testning är de flesta resultat från fågelövervakningen relativt tydliga och samstämmiga. Så här långt förefaller inte platsundersökningarna i sig och den ökade mänskliga aktiviteten i området ha haft någon större påverkan på de arter som inventerats. För fem av de åtta arterna (bivråk, havsörn, fiskgjuse, göktyta och törnskata) har ingen påverkan alls konstaterats under perioden. Alla dessa arter uppvisar stabila eller ökande bestånd i området i stort. För de arter där även häckningsresultat följts upp finns inte heller där några effekter på detta. Delvis beror troligen avsaknaden av påverkan på att inga störande aktiviteter har utförts i anslutning till boplatser för dessa arter (rovfåglarna). För göktyta och törnskata indikerar dock resultaten att dessa arter är toleranta mot mänskliga störningar så länge de inte sker exakt på de platser där fåglarna valt att försöka häcka.

Inte heller för mindre hackspett eller nattskärna har några effekter på beståndsnivå kunnat konstaterats. Båda arterna har generellt ökat i antal under perioden i det regionala modellområdet. Precis som indikerats tidigare förefaller det dock finnas en geografisk effekt där båda arterna undviker de områden där de mest störande aktiviteterna inom platsundersökningarna genomförts. Delar av det lokala modellområdet som hyste mindre hackspettar och nattskärror inledningsvis, har stått tomma under senare år av platsundersökningarna. Antalet bebodda berguvsrevir har varit konstant under de senaste fem åren. Häckningsframgången har dock varit låg under den period platsundersökningarna pågått, lägre än motsvarande under åren innan dessa startade. Vidare så har framgången under de senaste fem åren (då platsundersökningarna pågått) varit lägre i det regionala (inkl. det lokala) modellområdet än i omkringliggande referensområden. De exakta sambanden mellan platsundersökningarnas verksamhet och häckningsframgången hos berguvarna är dock okänd. 2006 var exempelvis häckningsframgången usel, både i regionala modellområdet och i referensområdena.

Contents

| | | |
|----------|---|----|
| 1 | Introduction | 7 |
| 2 | Objective and scope | 9 |
| 3 | Equipment | 11 |
| 3.1 | Description of equipment | 11 |
| 4 | Methods | 13 |
| 4.1 | Listed species (Swedish red list; EU Birds directive annex 1) | 13 |
| 4.2 | Execution | 13 |
| 4.3 | Data handling | 14 |
| 4.4 | Analyses and interpretations | 14 |
| 5 | Results | 15 |
| 5.1 | Listed species | 15 |
| 6 | Discussion | 23 |
| 7 | References | 25 |
| | Appendix | 27 |

1 Introduction

This document reports the data gathered within the monitoring bird surveys, one of the activities within the site investigations in Simpevarp, in 2006. The bird surveys have now been going on for five years. For most of the species presented here however, data enabling comparison is only available from 2003 onwards, allowing comparisons during a four-year period. The aim of this report is to evaluate the effects of the ongoing site investigations on the breeding bird fauna in the area for a number of selected listed species (according to the Swedish Red List and/or the EU Birds Directive). The surveys were made according to activity plan AP PS 400-06-025 which is SKB's internal document. In Table 1-1 the controlling document for performing this activity is listed.

The project has been conducted by the Department of Animal Ecology, Lund University. The report covers the whole regional model area. Original results are stored in the primary data bases (SICADA) and are traceable by the activity plan number.

Table 1-1. Controlling documents for the performance of the activity.

| Activity plan | Number | Version |
|--|------------------|----------------|
| Uppföljning av utvalda rödlistade fåglar | AP PS 400-06-025 | 1.0 |

2 Objective and scope

The site investigations in Simpevarp started in 2002. SKB has from the start of the investigations aimed at monitoring the effects from all the ongoing activities on the fauna in the area. This in order to ensure that the site investigations are carried out in such a way that disturbances to the fauna, especially sensitive and vulnerable species, can be held at a minimum level (without hindering the essential parts of site investigations).

Simpevarp is an area rich in birds, holding high densities of both common species and more rare ones such as species listed in the Swedish Red List /Gärdenfors 2005/ and European Unions Birds directive 79/409/EEG: Annex 1, /www.naturvardsverket.se/ (cf. /Green 2003, 2004, 2005, 2006/). The monitoring part of the bird surveys aim at tracking changes in overall bird numbers for certain listed species (Swedish Red List and the EU:s Birds Directive) in the whole regional model area. In addition to looking at overall numbers for these species, the programme aims at investigating breeding success when this is possible.

The monitoring programme has been carried out at different levels, both geographically and regarding which birds that has been monitored. More details about these levels are presented in /Green 2003, 2004, 2005, 2006/.

Regional model area. This is a level covering an area of about 270 km² (area of possible large-scale effects). In Simpevarp the land area of the regional model area is about 150 km². This area is shown by a thick unbroken line in Figure 2-1. Within this area a number of selected species listed in the Swedish Red List and/or the EU Birds Directive are monitored (from 2004 onwards, but during 2002 and 2003 all listed species as well as non-listed raptors and owls were monitored). The aim of the surveys is to find out the yearly number of breeding pairs within the area, and for a few species also to establish the breeding success of these. The parts of the regional model area situated west of highway E-22 (shaded in Figure 2-1) are excluded from our surveys as these are situated far away from the main activities within the site investigations. Hence, a land area of about 130 km² is monitored.

Local area. This level involves a smaller area covering all the potential drilling sites, and is the core area of the site investigations. The size of the area in Simpevarp is about 20 km² (in 2002 a larger preliminary local area of about 50 km² was used, but this was scaled down to the present one before the surveys in 2003). The local area is shown with a thick, broken line in Figure 2-1. Also in this area special attention is directed at listed species.

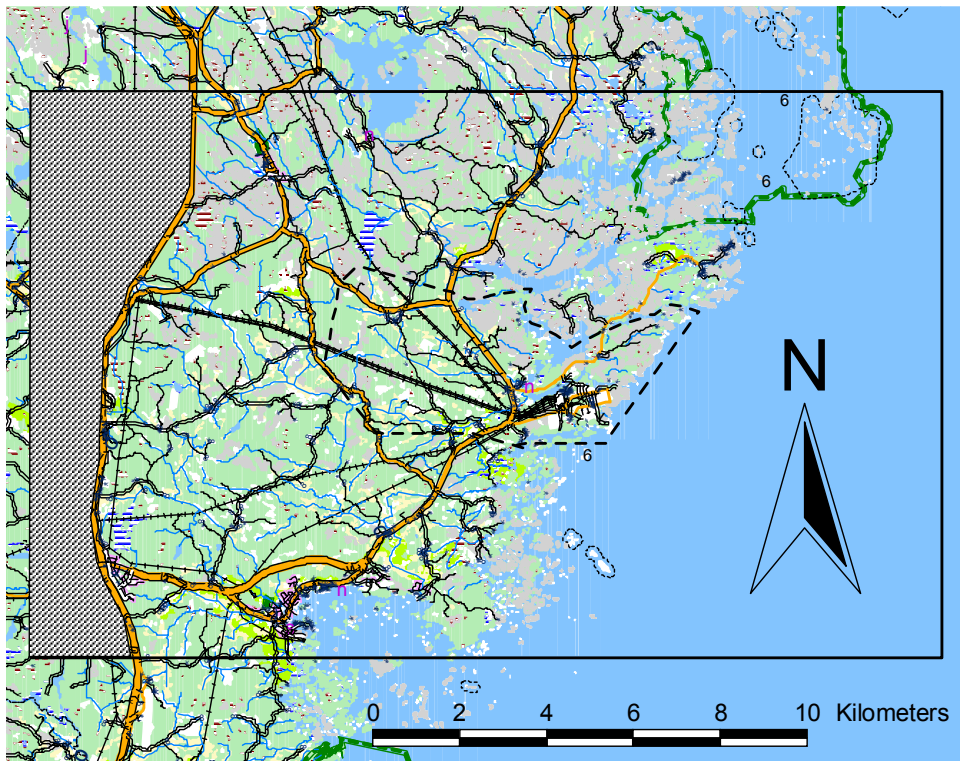


Figure 2-1. Map of the survey area in Simpevarp (upper). The regional model area is shown with a thick unbroken line (shaded part west of highway E-22 is excluded from the surveys), the local area is shown with a thick, broken line. From GSD-Terrängkartan © Lantmäteriverket Gävle 2001. Consent M2001/5268.

3 Equipment

3.1 Description of equipment

The following equipment was used when conducting the bird surveys.

- GPS (Garmin 12).
- Binoculars and telescopes.
- Field maps showing each days work.
- Note books and protocols.
- Vehicles for transport to and from the study area.
- Cell phones (safety equipment when working alone in the field).

4 Methods

The methods used are described in detail in activity plan AP PS 400-06-025 – SKB:s internal controlling document.

An overview of the methods used for monitoring purposes are presented below.

4.1 Listed species (Swedish red list; EU Birds directive annex 1)

The species occurring in Simpevarp and included in the Swedish Red List and/or the EU Birds Directive are shown in Appendix 1. Since the Swedish Red List was updated in 2005, with some earlier listed species being removed from the list and some new species being added /Gårdenfors 2005/, both species being red-listed before- and after 2005 are shown together with the latest updates on estimated local population size in Simpevarp.

Starting from 2004, a selection of these species are monitored on a yearly basis. The species in question are shown in Table 4-1. Selection of monitoring species were made according to a set of different criteria. A species was included for further monitoring if one or several of these criteria were fulfilled: **i)** Simpevarp is a vital area for the species in a larger (e.g. national) perspective; **ii)** The species in question is suspected to be sensitive to disturbances and thus possibly affected in a negative way by the ongoing site investigations; **iii)** The species show a negative population trend at the national level (but not necessarily in Simpevarp); **iiii)** Simpevarp holds high densities of the species.

These species were monitored in 2006 by visiting known nesting places/territories used in 2002–2005, combined with visits to habitats suspected to possibly hold the species in question. Visits to nest sites/territories/suitable habitats were made during relevant periods, that is when presence of the birds is expected to be easy to detect. Detailed following up of breeding results were made for some species, i.e. white-tailed eagle, osprey and eagle owl. All observations of the selected listed species were registered with data on bird species, number of birds, position (from GPS or recorded on field maps) and local time during the field work. For one of the more numerous species, monitoring was not made in the whole regional model area but in a selected part of this (red-backed shrike).

4.2 Execution

The monitoring field work in 2006 was carried out during the period 2006-05-10 – 2006-08-02. The field work was partly made by local ornithologists and partly by the project leader. Arne Schönbeck and Tommy Larsson made the surveys and follow ups of breeding results of white-tailed eagles, ospreys and eagle owls. The white-tailed eagle work is carried out within the ongoing national project concerning this species (through Björn Helander, Swedish Museum of Natural History, Stockholm).

Table 4-1. Listed species selected for monitoring in the Simpevarp area during 2006.

| English name | Swedish name |
|---------------------------|------------------|
| Honey Buzzard | Bivråk |
| White-tailed Eagle | Havsörn |
| Osprey | Fiskgjuse |
| Eagle Owl | Berguv |
| Wryneck | Göktyta |
| Lesser spotted Woodpecker | Mindre hackspett |
| Nightjar | Nattskärra |
| Red-backed shrike | Törnskata |

Tommy Larsson also made the main part of the honey buzzard field work. Martin Green carried out the remaining part of the surveys of listed species (lesser spotted woodpecker, wryneck, nightjar and red-backed shrike).

4.3 Data handling

In the field all registered birds of the selected species were recorded in notebooks with data on species, number of individuals and time together with additional data on bird behaviour and circumstances where such data were relevant. Observations were registered with exact position individually taken directly from the GPS in the field. Positions have the same resolution as the GPS-system. After each days field work all the data were transferred to pre-made protocols. Data were then entered into an Excel-file from protocols where after the file was cross-checked against the field notes by the project leader. This base-file with data on species, numbers and positions can then be used for different GIS applications, for evaluating bird densities and further calculations.

4.4 Analyses and interpretations

Changes in numbers of territories at the species level for selected listed species are compared and discussed but not statistically tested in this report. The same procedure is also used for comparing breeding results in a few cases. The rationale for this is that with a time series of only (in most cases) four years, any such test is non-sensical. Statistical testing will be possible after a time series of five years, although statistical power will still be low (i.e. there is a low probability of finding statistically significant results even though true, biologically significant changes may have occurred), due to the short time frame.

For most species the actual number of recorded territories/nests/pairs are reported and shown in figures. For the red-backed shrike however, population change is shown in the form of a chain-index. The reason for not using the recorded number of territories directly in this case is that the monitored areas have not remained exactly the same during the years. To come around this problem, but still be able to compare the population development in an easily understandable way, a chain index is constructed. The chain index is created by comparing **areas checked equally well** in two following years and calculating the change in percent between these two. Then the procedure is repeated for next two following years and the new change (in percent) is added/subtracted to the figure. In the red-backed shrike case the calculation was made as follows (in this case with regional model area, excluding the local area as an example).

- Index for the start year is set to 1. This is the basis for all future comparisons.
- In our first year with a reasonable coverage of shrikes in Simpevarp (2003), 34 occupied territories were recorded. Of these, 13 were in areas covered equally well also in the following year (index calculations can only be made when at least two years of data is collected, since it is made in a back-wards calculating mode).
- In 2004, our second year of good coverage, 54 occupied territories were recorded. Of these, 19 were in parts checked equally well in 2003.
- The index for 2004 is calculated as: $((19-13)/13) + 1 = 1.46$. Interpreted as a 46% increase in numbers between 2003 and 2004.
- There were 35 recorded territories in 2004 in areas covered equally well also in 2005.
- 30 occupied territories were recorded in these parts in 2005.
- The index for 2005 is then calculated as: $((30-35)/35) + 1.46 = 1.32$. Interpreted as a 14% decrease in numbers between 2004 and 2005 (but still on average a 32% increase from 2003 to 2005!).
- Coverage in 2006 was identical to 2005. 24 occupied territories were registered. Hence, the index will be $((24-30)/30) + 1.32 = 1.12$

5 Results

English and Swedish names of the birds are used throughout the results part. Latin names are given the first time a species is mentioned.

5.1 Listed species

The following section gives a summary of the population development in the last three-four years of eight selected species listed as endangered, threatened or vulnerable according to the Swedish Red List /Gärdenfors 2005/, and/or listed in the European Unions' Birds Directive Annex 1 (79/409/EEG) within the Simpevarp area. These eight species were selected for monitoring because they are of high conservation concern or because the Simpevarp area is a stronghold for the species in question. The information presented is based on data gathered in all five years (2002–2006) although a complete coverage of the regional model area was not gained until 2003.

The text covering breeding success of white-tailed eagles is written by Björn Helander, Swedish Museum of Natural History, Stockholm.

Honey Buzzard *Pernis apivorus* *Bivråk* (Sw. Red List; EU Annex 1)

Honey Buzzard numbers increased slightly from 2005 to 2006. This was the third year with good coverage of the honey buzzards in Simpevarp, see /Green 2005, 2006/. During these years the situation has been very stable with around ten pairs present annually and very little variation in occupancy between individual territories as well. Of the twelve recorded territories, eight has been occupied in all three years. Of the remaining four, three has been occupied in two years and vacant in one and only one territory has been occupied in one year and vacant in two. Four territories extend into the local area (four in 2004, three in 2005). Breeding results has not be monitored in Simpevarp so far, but it should be interesting to do so in future years.

Simpevarp hold relatively high densities of honey buzzards (about 0.10 pairs/km²). It is likely that the small-scaled landscape dominated by forest with many small agricultural areas interspersed, together with a high number of sun-hours during summer (typical for the south-east coast of Sweden) promotes a high insect abundance. Honey buzzards are dependent on larger social insects like wasps, bees and bumble-bees for successful breeding. The young honey buzzards are mainly raised on a diet consisting of insect larvae.

At present we can not rule out that the high number of recorded pairs in 2006 in part is an effect of that we now have a better knowledge of the honey buzzards in the area compared to in earlier years.

There are so far no indications of that the honey buzzards should be affected by the site investigations in any way. So far, no intensive parts of the site investigations has been conducted in areas in close association with honey buzzards.

The honey buzzard is classified as 'Endangered' (starkt hotad) in the Swedish Red List. National population size has declined with 50–70% during the last three decades and was estimated to about 5000 pairs in 2004. The main causes of the decline are thought to be large-scale landscape changes due to both agriculture and forestry, at the same time as conditions along the migration routes and in the wintering areas have deteriorated /Artdatabanken 2005/.

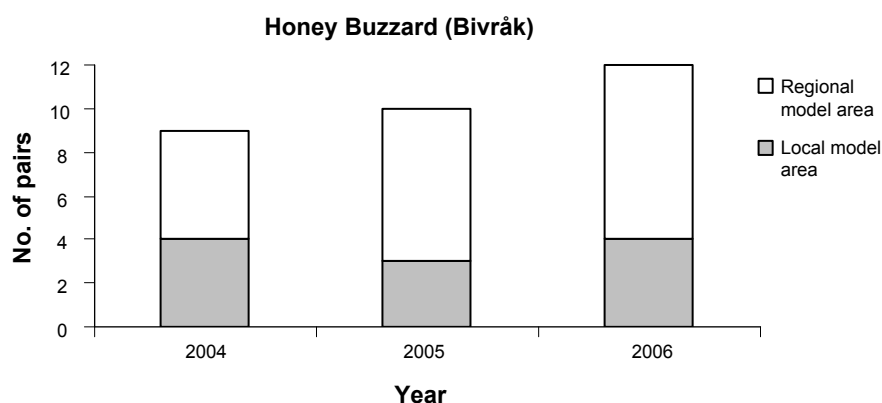


Figure 5-1. Number of territorial pairs of Honey Buzzards in Simpevarp in 2004–2006. Shaded parts show the number of territories with parts extending into the local area.

White-tailed eagle *Haliaeetus albicilla* Havsörn (Global Red List, Sw. Red List; EU Annex 1)

This year was still another successful season for the white-tailed eagles in the Simpevarp area, and there were again no indications of disturbance or other complications in the area this year. The breeding success in surrounding reference areas were substantially lower this year than in 1998–2001 and 2002–2005. One pair in the reference areas failed to lay eggs this year whereas two breeding attempts failed for unknown reasons, possibly as a result of cold weather and snow during the egg-laying period in March. The breeding performance of white-tailed eagles was less successful this year in most regions on the Swedish Baltic coast, at least in part due to harsh weather during early spring.

Osprey *Pandion haliaetus* Fiskgjuse (EU Annex 1)

Three nests were active in 2006, which is one less than in previous years. As usual there are probably one or two more pairs breeding in the inland parts of the regional model area but these nests have not yet been found. As in 2004–2005, there was an occupied nest producing young, just outside the regional model area as well. Two of the three pairs produced large young in 2006 and four young were fledged. This means that breeding success was back at a normal level after the low output in 2005.

Breeding results for ospreys has been surveyed along the coast of eastern Småland by Tommy Larsson and Arne Schönbeck since 1999 (1998 was a start-up year with a smaller coverage). Each year 15–25 nests are checked, the number of breeding attempts registered and the number of large young are counted and ringed. Breeding results during 1999–2006 for the whole surveyed area (including the SKB regional model area) are shown in Table 5-2.

The number of breeding attempts remained at the same level as in 2005. Breeding success was on average good.

The breeding results in the SKB regional model area (SKB RMO) is showed in Table 5-3 in comparison with results from the remaining study area (REF), here used as a reference area.

Table 5-1. Per cent successfully breeding pairs of white-tailed eagle in 2002–2006 and 1998–2001 (n = number of checked territorial pairs).

| Area | 1998–2001 | 2002 | 2003 | 2004 | 2005 | 2006 | n |
|-----------|-----------|------|------|------|------|------|----|
| Simpevarp | 88 | 100 | 0 | 100 | 100 | 100 | 18 |
| Reference | 78 | 86 | 83 | 86 | 75 | 57 | 64 |

Table 5-2. Breeding results of Ospreys along the Mönsterås- Oskarshamn- Simpevarp coast (including the SKB regional model area) during the last eight years.

| Year | Controlled nests | Breeding attempts | Successful nests | % successful breeding attempts | No. of large young per breeding attempt |
|------|------------------|-------------------|------------------|--------------------------------|---|
| 1999 | 15 | 11 | 7 | 64 | 1.0 |
| 2000 | 20 | 12 | 10 | 83 | 1.8 |
| 2001 | 17 | 12 | 11 | 92 | 1.2 |
| 2002 | 18 | 15 | 12 | 80 | 1.4 |
| 2003 | 21 | 18 | 11 | 61 | 1.4 |
| 2004 | 23 | 18 | 10 | 56 | 1.2 |
| 2005 | 22 | 15 | 11 | 73 | 1.8 |
| 2006 | 18 | 14 | 9 | 64 | 1.5 |
| Mean | 19 | 14 | 10 | 70 | 1.4 |

Table 5-3. Breeding success of ospreys in the regional model area at Simpevarp compared to the reference area south of this in 2003–2006.

| Year | SKB RMO % successful breeding attempts | SKB RMO No. of large young per breeding attempt | REF % successful breeding attempts | REF No. of large young per breeding attempt |
|------|--|---|------------------------------------|---|
| 2003 | 75 | 2.0 | 50 | 1.1 |
| 2004 | 50 | 1.0 | 57 | 1.3 |
| 2005 | 25 | 0.8 | 91 | 2.2 |
| 2006 | 67 | 1.3 | 64 | 1.5 |
| Mean | 56 | 1.2 | 63 | 1.4 |

Local population size has remained at a similar level during all years of the site investigations. The ‘missing pair’ in 2006 had their territory well outside of the local model area and disturbance due to the site investigations can not have anything to do with the disappearance. Still, it is likely that human disturbances are responsible for the loss of this pair as they have their territory in an area with a high level of human presence. Ospreys are sensitive to prolonged disturbances around nest sites, especially during the early stages of the breeding cycle.

The indication of a negative trend in breeding success from the last three years was broken this year and there are no indications of that the site investigations should affect the ospreys in any negative way.

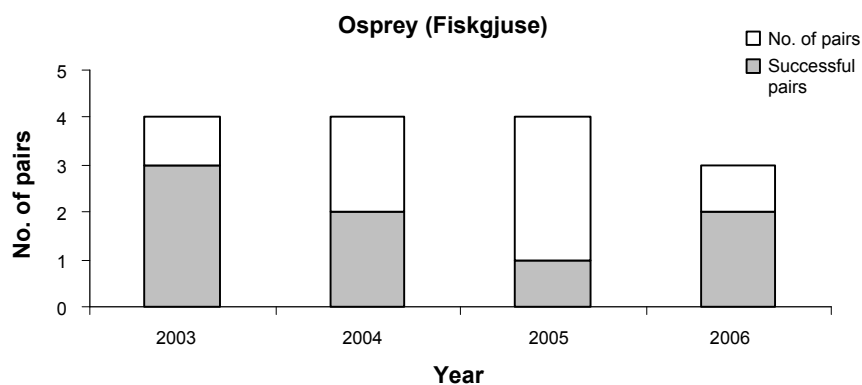


Figure 5-2. Number of breeding pairs of Ospreys (Fiskgjuse) in the regional model area at Simpevarp 2003–2005. Shading show the number of successful pairs.

Eagle owl *Bubo bubo* Berguv (Sw. Red List; EU Annex 1)

Another year with a very stable situation regarding numbers of occupied territories. Breeding output was however extremely poor. No young were produced, neither in the regional model area nor in the surrounding reference areas.

Breeding output for the regional model area and the reference area as a comparison is shown in Table 5-4.

A really lousy year when it comes to breeding output. Obviously, the situation was not only bad in the SKB area but also at a larger scale. Still, adult birds seemed to be present in the territories during the year. Whether these were complete pairs or just single birds is not known in all cases. In some cases the only sign of presence was calling males in spring.

One could speculate about if the presence of avian influenza, manifested by infected ducks at Simpevarp during late winter, could have anything to do with the low breeding output of eagle owls this year. Dead eagle owls carrying the virus were found in other areas along the east coast of Sweden and possibly, infected birds could have occurred also in Simpevarp. If local eagle owls were infected as well, there are two possible ways this could affect the breeding output. If owls were killed by the virus infection, one of the mates in a pair could have been lost while the territory still seem to be occupied (by the remaining mate). Obviously a single owl will have a very low reproductive output. Another way that infections could reduce breeding success is if the birds survive the infection, but are in a such a bad condition that they simply cannot produce viable eggs. This is of course only speculations but never the less a possibility.

Table 5-4. Breeding results (number of young/controlled territory) for Eagle Owls in the regional model area and reference areas north and south of this in 2002–2006.

| Year | SKB RMO No. of large young per territory | REF No. of large young per territory |
|------|--|--|
| 2002 | 0 | 1.0 |
| 2003 | 0 | 2.3 |
| 2004 | 0.8 | 1.3 |
| 2005 | 0.8 | 1.3 |
| 2006 | 0 | 0 |
| Mean | 0.3 | 1.2 |

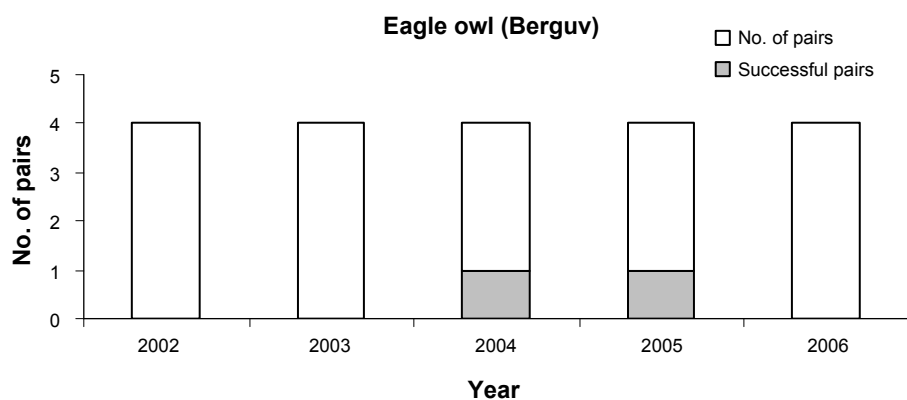


Figure 5-3. Number of Eagle owl (*Berguv*) pairs in the regional model area in Simpevarp 2002–2006. Shaded parts show number of successful pairs.

Comparing breeding output between the SKB-area and the reference area for the last five year period we find that breeding output is almost significantly lower around Simpevarp (Wilcoxon's sign rank test, $Z = -1.84$, $p = 0.07$, $N = 5$, where Z is the test statistic computed by the test, p is the probability that the two data sets differ statistically and N is the numbers of compared years). As pointed out earlier, this was also the case before the site investigations started. The reason behind this difference is presently unknown.

Wryneck *Jynx torquilla* Göktyta (Sw. Red List)

Wryneck numbers continued upwards in 2006 /cf. Green 2006/. After the large increase between 2004 and 2005, total numbers increased a further 19% from 2005 to 2006. The increase was confined to the regional model area while numbers in the local model area remained relatively constant (actually a minor drop from eight to seven occupied territories). There are no signs what so ever of that wrynecks should be negatively affected by the ongoing site investigations. Local population trend is positive.

Distribution of wrynecks in 2006 essentially followed the pattern registered in earlier years. The majority (76%) were registered in areas within a few km from the coast.

The wryneck is classified as 'Near-Threatened' (missgynnad) in the Swedish Red List /Gärdenfors 2005/. The number of wrynecks in Sweden decreased with over 50% between 1975 and 2004, but the numbers have remained fairly stable during the last decade /Lindström and Svensson 2006/. The reason behind the large decline is probably loss of suitable habitats as a large proportion of small-scale farms in largely forested areas were abandoned in the mid 1900-s. National population size is estimated to be 5,500–15,000 pairs /Artdatabanken 2005/.

Lesser spotted woodpecker *Dendrocopus minor* Mindre hackspett (Sw. Red List)

Lesser spotted woodpecker was another species with a generally positive population development in Simpevarp and where patterns shown in earlier years remained the same in 2006. Overall, there was an increase from 21 to 25 occupied territories between 2005 and 2006, a 24% increase.

This time numbers increased both in the local model area and in the regional model area outside of this cf. /Green 2006/. Looking in a longer perspective at parts directly affected by the site investigations and areas not directly affected, there still remains a difference. While numbers outside of the local model area are increasing at large, numbers inside the latter remain at a more or less constant level.

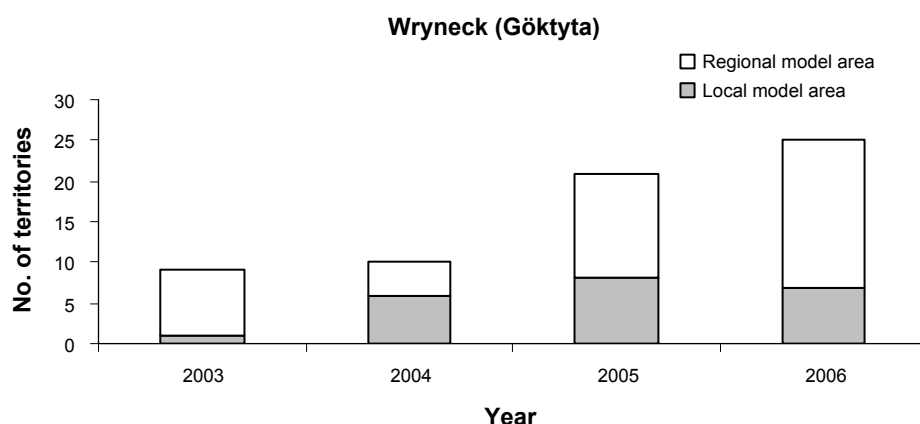


Figure 5-4. Number of recorded occupied territories of Wrynecks (*Göktyta*) in Simpevarp 2003–2006. Shaded parts show the number of territories within the local area.

Lesser spotted Woodpecker (Mindre hackspett)

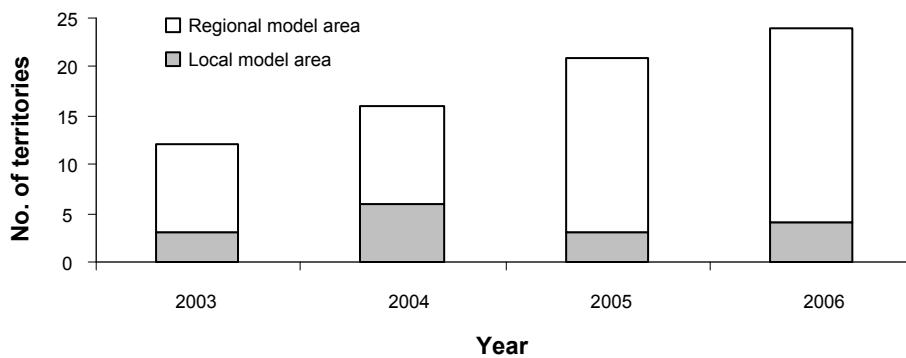


Figure 5-5. Number of occupied territories of Lesser spotted woodpecker (*Mindre hackspett*) in Simpevarp 2003–2006. Shaded parts show number of territories within the local area.

Further indications in the same direction are given by that out of seven known territories within the local area, used at least once during 2002–2005, four (57%) were occupied in 2006. Corresponding figures from the regional model area outside of the local area were that out of 19 territories used at least once in 2002–2005, 18 (95%) were occupied also in 2006.

The lesser-spotted woodpecker is classified as ‘Near-Threatened’ (*missgynnad*) in the Swedish Red List. National numbers decreased with about 50% between 1975 and 1990, but are thought to have remained fairly stable during the last decade. The lesser-spotted woodpecker has been negatively affected by the loss of dead wood due to modern forestry and also by the conversion of mixed and deciduous forests to monoculture conifer forests. National population size is estimated to about 3000 pairs /Artdatabanken 2005/, which means that the numbers in Simpevarp regional model area are not very far from being 1% of the national total!

Nightjar *Caprimulgus europaeus* *Nattskärra* (Sw. Red List; EU Annex 1)

The ‘flagship species’ of the Simpevarp area had a peak (?) year in 2006. No less than 87 ‘singing’ males were registered during the census in June, a 32% increase from 2005 and 22% above the previously highest recorded number (71 in 2004). Seen over the whole four-year period 2003–2006 the nightjars have increased with 87% in Simpevarp. One should bear in mind though that coverage was not complete in 2003, probably inflating the estimate of the observed increase. As usual most nightjars were found in the northern half of the regional model area, this year 87% were registered in that part (annual variation 2003–2005: 71–89%).

Nightjar numbers within the local area remained fairly stable although an increase of similar proportional magnitude has been noted also there during the four-year period 2003–2006 (from five to eight territories). Looking at the geographical distribution of birds it still seems as if the nightjars avoid areas with too disturbing parts of the site investigations (cf. /Green 2005, 2006/).

Nightjar densities in Simpevarp are the highest recorded in Sweden over such large areas. In the northern half of the regional model area (50 km²) there were 1.5 nightjar-territories/km² in 2006. Normal densities are reported to be 0.1–0.2 territories/km², but in optimal habitats 2–5 territories/km² can be found /BWP 1985/.

The nightjar is classified as ‘Vulnerable’ (*sårbar*) in the Swedish Red List. National numbers have probably decreased with up to 20% during the last decades, but regionally the decrease has been much higher. This applies to the more northern parts of the distribution range in Norrland and Svealand. The factors behind the decrease are probably related to large-scale changes in forestry and agricultural practises. The latest estimate of the national population size is 2000–2500 pairs, but these figures are quite uncertain /Artdatabanken 2005/. If correct, this means that around 3–4% of the national population occur in the Simpevarp regional model area and hence, as pinpointed earlier, that the area is of national importance for the species.

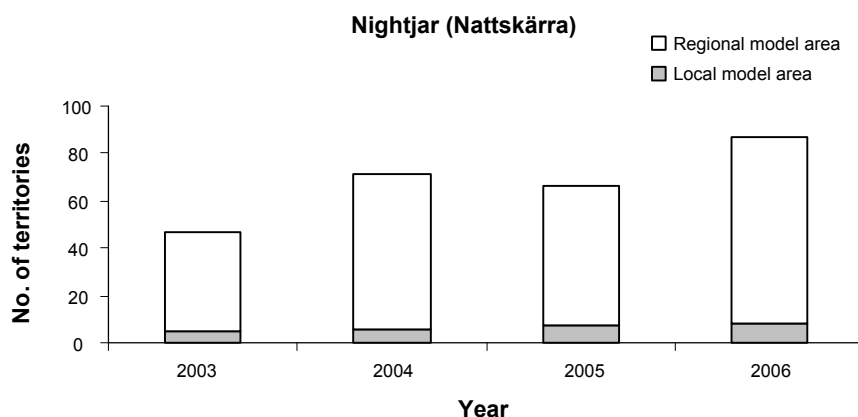


Figure 5-6. Number of occupied Nightjar (*Nattskärra*) territories in the regional model area of Simpevarp 2003–2006. Shaded parts show the number of pairs in the local area. Note that coverage of the area was not complete in 2003, probably making showed numbers in that year an underestimate of true numbers.

Red-backed shrike *Lanius collurio* Törnskata (EU Annex 1)

Red-backed shrike numbers have been stable between 2003 and 2006. The population development of red-backed shrikes in Simpevarp is shown below in Figure 5-7. As in the report from 2005 /Green 2006/, population development is shown by an index where the percent change between areas checked equally well in years following each other are compared. Index for 2003 (the first year with decent coverage of the species) is set to one. The figure should be read as there on average has been a 36% increase in red-backed shrike numbers within the local area between 2003 and 2006 (index series 1 – 1.09 – 0.93–1.36) etc.

Overall there has been a slight increase of about 10%, well within the error margin of the used method. Looking at the local and regional areas separately, the development was very similar during 2003–2005. In 2006 however, numbers increased in the local model area and decreased in the regional model area.

The conclusion from these figures is that the shrikes in Simpevarp are doing fine in general. The pattern found in the local area indicate that there is no negative impact on the shrikes from the site investigations. The reason for the increase in the local model area from 2005 to 2006 is essentially unknown. No marked changes in local habitats have occurred between the years. The decrease in the regional model area is likely to be connected to over-growth of areas under power wires. Suitability for shrikes in these areas have gone down during the period and the decrease in numbers is probably a response to this (see /Green 2006/).

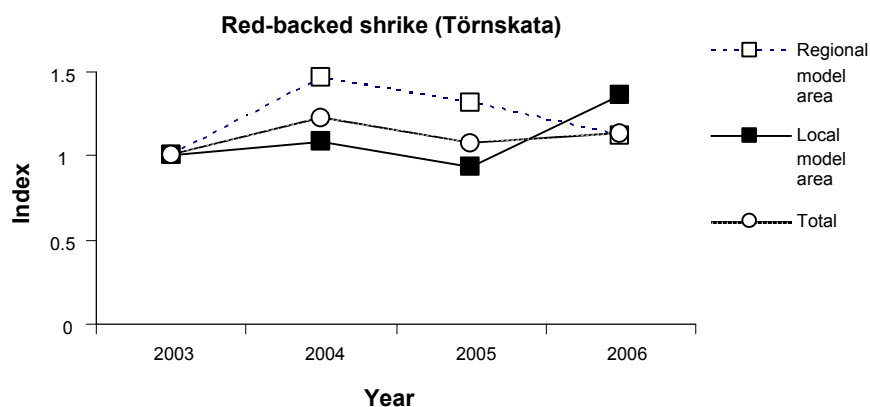


Figure 5-7. Population development of red-backed shrikes in Simpevarp 2003–2006 shown as a chain index. Index for year 2003 is set to 1. See text for further explanations.

The red-backed shrike is classified as ‘Near-Threatened’ (Missgynnad) in the Swedish Red List /Gärdenfors 2005/. National numbers have decreased with over 50% during the last 30 years /Lindström and Svensson 2006/ and numbers in a well-studied, predominantly farmland area outside Uppsala decreased from 120 to 60 pairs during 1998–2003 /Artdatabanken 2005/. Reasons for the decrease at a general level is thought to be due to habitat loss, as many semi-natural grazing pastures have disappeared during later decades. National population size of red-backed shrikes is estimated to be about 23,000 pairs /Artdatabanken 2005/.

Table 5-5. Population changes of selected listed species in Simpevarp between 2005 and 2006. A + sign means that the number of territories has increased, a – sign means that it has decreased, a 0 that there is no major change and ? denotes that the situation is unclear.

| Species | Regional model area | Local area | Whole area |
|---------------------------|---------------------|------------|------------|
| Honey Buzzard | + | 0/+ | + |
| White-tailed Eagle | 0 | | 0 |
| Osprey | – | 0 | – |
| Eagle Owl | 0 | 0 | 0 |
| Wryneck | + | 0/– | + |
| Lesser Spotted Woodpecker | + | 0/+ | + |
| Nightjar | + | 0/+ | + |
| Red-backed shrike | – | + | + |

6 Discussion

This is the fourth report evaluating effects from the ongoing site investigations on the breeding bird fauna in Simpevarp. Unlike earlier reports, this one deals only with a selected number of listed species. That is species listed either in the Swedish Red List /Gärdenfors 2005/ or in the EU Birds Directive Annex 1.

We are getting close to a time series that is possible to analyse statistically. A minimum period of five years is a sensible requirement for such tests, which means that for most species we need another year of data. Still, one should remember that statistical power will be weak for such an analysis. Anyway, results gathered so far in Simpevarp are relatively straight forward and there are few controversial issues that needs detailed statistical analyses to disentangle.

In general terms none of the monitored listed species has shown any population decline over the site investigation period. On the contrary, several species has actually increased in numbers through this period. Hence, impacts from the site investigations seem to be small or in some cases non existing. For five of the eight monitored species no impacts what so ever has been registered. These are honey buzzard, white-tailed eagle, osprey, wryneck and red-backed shrike. Regarding the raptors this is in part, or possibly to a large extent, explained by that no disturbing activities have been carried out close to nest sites of these birds. If this had not been the case the situation would probably have looked different. Wrynecks and red-backed shrikes seem to be tolerant and not affected even if there is an increased human presence in their neighbourhoods.

The nightjars and lesser spotted woodpeckers have not been affected at large either, but there have been, and are tendencies of that these species avoid areas with too high levels of disturbing activities. Hence, areas close to drilling sites have been avoided through the site investigations. In these cases it would be interesting to see if these species will return to areas previously used, when the site investigations are finished. Signs in that direction has been noted in Forsmark for lesser spotted woodpeckers.

Eagle owl finally, is perhaps the species where the signs of that the increased human presence in the area might have an impact is strongest. So far no effects have been registered on population size though. This has been extremely stable during the period. Breeding success has however been poor. Both poorer than in surrounding reference areas and also lower than in the years before the site investigations. There may however be other explanations for the poor breeding output in Simpevarp. Breeding results here were lower than in surrounding reference areas even before the site investigations started and there may be unknown factors at play here that we do not know anything about. A speculative possible explanation for the extremely low output in 2006, that was not only confined to the SKB area, is that this in some way was connected to the occurrence of avian influenza virus along the east coast of Sweden in late winter early spring 2006. Dead eagle owls, carrying the virus, were found in other areas and it is possible that also local eagle owls in Simpevarp were affected, either by direct mortality or by lowering the condition of birds and hence preventing successful breeding.

For eagle owl, and a few other species of high conservation concern such as honey buzzard, white-tailed eagle and osprey it is of high interest to keep on trying to avoid activities close to known breeding sites during critical periods of the breeding cycle.

7 References

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<http://www.naturvardsverket.se>

Appendix

1. List of all listed (Swedish Red List, SRL, and EU Birds Directive Annex 1, EU) bird species, possibly breeding in Simpevarp and recorded during 2002–2006. Since the Swedish Red List was updated in 2005, a few species being red-listed before, but not after, 2005 are included as well. These species are shown in parenthesis. Otherwise the listing follow the updated version of the Red List /Gärdenfors 2005/.

| English name | Swedish name | Latin name | Listing | Estimated population size (pairs/territories) in Simpevarp (regional model area) |
|---------------------------|---------------------|--------------------------------|---------|--|
| Whooper Swan | Sångsvan | <i>Cygnus cygnus</i> | EU | 3 |
| (Gadwall) | (Snatterand) | (<i>Anas strepera</i>) | (SRL) | 1 |
| Shoveler | Skedand | <i>Anas clypeata</i> | SRL | 1 |
| Velvet Scoter | Svärta | <i>Melanitta fusca</i> | SRL | 5 |
| Hazelhen | Järpe | <i>Bonasia bonasia</i> | EU | 10 |
| Black Grouse | Orre | <i>Tetrao tetrix</i> | EU | 20 |
| Capercaillie | Tjäder | <i>Tetrao urogallus</i> | EU | 10 |
| Black-throated Diver | Storlom | <i>Gavia arctica</i> | EU | 2 |
| Honey Buzzard | Bivräk | <i>Pernis apivorus</i> | SRL, EU | 10–12 |
| White-tailed Eagle | Havsörn | <i>Haliaeetus albicilla</i> | SRL, EU | 2 |
| Marsh Harrier | Brun kärrhök | <i>Circus aeruginosus</i> | EU | 1 |
| Osprey | Fiskgjuse | <i>Pandion haliaetus</i> | EU | 3–5 |
| Crane | Trana | <i>Grus grus</i> | EU | 30 |
| Turnstone | Roskarl | <i>Arenaria interpres</i> | SRL | 5 |
| Common Tern | Fisktärna | <i>Sterna hirundo</i> | EU | 30 |
| Arctic Tern | Silvertärna | <i>Sterna paradisaea</i> | EU | 180 |
| Caspian Tern | Skräntärna | <i>Sterna caspia</i> | SRL, EU | 1 |
| Stock dove | Skogsduva | <i>Columba oenas</i> | SRL | 20 |
| Pygmy Owl | Sparvuggla | <i>Glaucidium passerinum</i> | EU | 13 |
| Tengmalms Owl | Pärluggla | <i>Aegolius funereus</i> | EU | 0–2 |
| Eagle Owl | Berguv | <i>Bubo bubo</i> | SRL, EU | 4 |
| Nightjar | Nattskärna | <i>Caprimulgus europaeus</i> | SRL, EU | 65–90 |
| Wryneck | Göktyta | <i>Jynx torquilla</i> | SRL | 30 |
| Black woodpecker | Spillkråka | <i>Dryocopus martius</i> | EU | 25 |
| Lesser Spotted Woodpecker | Mindre hackspett | <i>Dendrocopus minor</i> | SRL | 25 |
| Wood Lark | Trädlärka | <i>Lullula arborea</i> | EU | 31 |
| Skylark | Sånglärka | <i>Alauda arvensis</i> | SRL | 10 |
| Wheatear | Stenskvätta | <i>Oenanthe oenanthe</i> | SRL | 25 |
| Grashopper warbler | Gräshoppsångare | <i>Locustella naevia</i> | SRL | 0–1 |
| Red-breasted Flycatcher | Mindre flugsnappare | <i>Ficedula parva</i> | SRL, EU | 5 |
| Marsh Tit | Entita | <i>Parus palustris</i> | SRL | 500 |
| Red-backed Shrike | Törnskata | <i>Lanius collurio</i> | SRL, EU | 150 |
| Nutcracker | Nötkråka | <i>Nucifraga caryocatactes</i> | SRL | 10 |
| Linnet | Hämpling | <i>Carduelis cannabina</i> | SRL | 20 |
| Scarlet Rosefinch | Rosenfink | <i>Carpodacus erythrinus</i> | SRL | 20 |