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A preliminary overview of monitoring for raptors in Estonia

Predhodni pregled monitoringa populacij ptic roparic v Estoniji

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Estonia is situated on the eastern coast of the Baltic Sea. It has a long coastline and more than 1,500 islands and islets. The ground is mostly flat, rich in lakes and rivers. Forests cover over 40% and mires ca. 22% of the Estonian territory (Leibak *et al.* 1994). Altogether, 41 raptor species have been registered in Estonia (21 species of Accipitriformes, 8 species of Falconiformes and 12 species of Strigiformes) of which 21 species have large breeding populations or breed regularly in few pairs (Elts *et al.* 2009).

Main players

The Estonian raptor-monitoring programme is carried out by members of the NGO Estonian Ornithological Society (EOS, http://www.eoy.ee/en) raptor monitoring group, NGO Eagle Club (http://www.kotkas.ee/eagle-club) and some employees of the Environmental Board. The coordinator of raptor monitoring at study plots is Dr Ülo Väli from the Estonian University of Life Sciences, while monitoring of eagles alone is coordinated by members of the Eagle Club (four coordinators for five breeding species). The EOS raptor monitoring group works mainly at permanent study plots, whereas Eagle Club members carry out their eagle monitoring programme across the entire country. During the last 10 years, about 30 active fieldworkers have been implementing the raptor-monitoring programme in Estonia.

Several institutions under the governance of the Ministry of the Environment use raptor-monitoring results. The Estonian Environment Information Centre (EEIC) aims at collecting, processing and generalizing data on the Estonian nature and the factors influencing it. The Information Centre provides reliable environmental information for the decision-makers in Estonia, for the public both in Estonia and abroad, and for various organizations. The Environmental Board works to preserve the diversity of nature, to protect natural habitats and to ensure favourable conditions for different species (e.g. by funding and coordinating national monitoring programmes and managing the creation and implementation of species action plans).

The results of monitoring are also used by ornithologists from the EOS and the Eagle Club for estimating the raptors' population sizes and calculating trends (e.g. Lõhmus *et al.* 1998, Elts *et al.* 2003, Elts *et al.* 2009), as well as for promoting the conservation of raptors in Estonia (e.g. Väli 2003, Männik 2006).

Estonia co-operates with Latvia through the European Regional Development Fund project "ESTLAT Eagles cross borders". The partners of Estonia in the LIFE project "Arrangement of Spotted Eagles and Black Stork conservation in Estonia (EAGLELIFE)", which was implemented in the 2004–2009 period, were Belarus, Latvia and Lithuania. Estonia participates in pan-European colour-ringing programmes for the White-tailed Eagle *Haliaeetus albicilla*, Lesser Spotted Eagle *Aquila pomarina*, Golden Eagle *A. chrysaetos* and Osprey *Pandion haliaetus*. Estonian academic raptor researchers also have close contacts with researchers from Finland, Sweden, Spain, etc.

National coverage

The Estonian raptor monitoring scheme includes two main parts. First, all 21 raptor species breeding in Estonia are monitored annually at permanent study plots (the minimum size of a plot is 50 km^2), which are located in different counties over the country. There were 16 such plots in 2012, with a total area of 1,595 km^2 (Figure 1). The number of species, the number and locations of occupied territories as well as nest-sites and information on their productivity are gathered from these particular plots (see Lõhmus 1999 & 2004).

Second, scarce raptors that occur at permanent study plots in few pairs, e.g. eagles and Eagle Owl *Bubo bubo*, are monitored all over the country. For this purpose, 25–90% of the known nest-sites of these species are visited and locations of known territories and nest-sites mapped every year. In addition to the nation-wide monitoring, the most numerous eagle species, i.e. the Lesser Spotted Eagle, is also studied at special monitoring plots, with a total area of 3,205 km^2 in 2012. These plots provide representative information on breeding densities and productivity of this species for estimating the size and trend of the Estonian population (Väli *et al.* 2011).

Additional information on Estonian raptors is gathered through several other projects and national

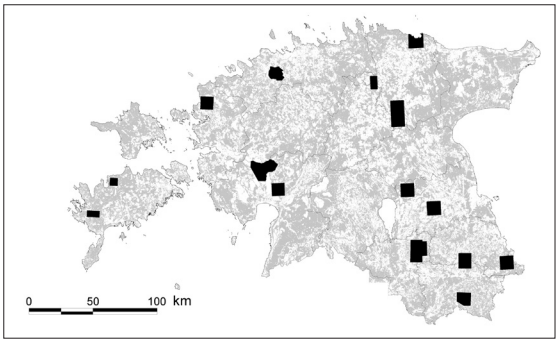

Figure 1: All raptors breeding in Estonia are monitored annually at permanent study plots (black areas, studied in 2012)

Slika 1: Vse ptice roparice, ki gnezdijo v Estoniji, so deležne letnega monitoringa na stalnih popisnih ploskvah (črno obarvane površine, vrste preučevane leta 2012)

monitoring programmes carried out by EOS: (1) *Common Breeding Bird Monitoring* programme (part of the Pan-European Scheme) shows long-term changes in the number of Buzzard *Buteo buteo*; (2) Estonian Breeding Bird Atlas (fieldwork was carried out from 2003 to 2009) gives an overview about distribution of raptor species breeding in Estonia; (3) EOS project "Bird of the Year" has produced interesting results about Goshawk *Accipiter gentilis* (Nellis 2006) and Tawny Owl *Strix aluco* (see EOS homepage) and (4) wintering bird count and wintering raptor count give information on the wintering populations of the Buzzard, Rough-legged Buzzard *B. lagopus* and Hen Harrier *Circus cyaneus*.

The Estonian Rarities Committee collects and independently verifies the records of rare raptors observed in Estonia (among other species). The activities carried out by NGO "Estbirding" are targeted to rare species – all interesting observations are collected and published on the web page of this NGO. The members of Estbirding have made overviews about the Red-footed Falcon *Falco vespertinus* influx in 2005 and Hawk Owl *Surnia ulula* wintering in Estonia.

There is an open online database for birdwatchers and naturalists as a part of a web interface for all the taxa found in Estonia (eBiodiversity; http://elurikkus.ut.ee). Information on the raptors' regional occurrence, wintering, phenology and breeding success is available in this database. The Estonian Red List of Threatened Species is also available in this interface.

Migration counts are being made at Kabli Bird Station (ringing and migration counts since 1969) and Sõrve Bird Observatory (established by Finnish non-profit NGO Estonian Birding Society in 1999).

Key species

All 21 regularly breeding raptor species in Estonia are monitored at study plots, while the most threatened (White-tailed Eagle, Greater Spotted Eagle *A. slanga*, Golden Eagle, Osprey and Eagle Owl) or the more abundant species with a long-term negative population trend (Goshawk) are monitored all over the country. These species, along with the Lesser Spotted Eagle, can be considered the key species addressed by the monitoring for raptors in Estonia.

The main purpose of the monitoring and protection activities so far has been to protect populations through the conservation of suitable nesting sites of these species. National action plans have been compiled for these species and all monitoring and protection activities are carried out according to these plans (e.g. Väli 2003, Männik 2006, Nellis 2006).

Strengths and weaknesses

The main strengths of monitoring for raptors in Estonia are a long dataset, experienced enthusiastic birdwatchers, the organizations within the framework of which they work, existence of the national raptor monitoring programme, and academic researchers dedicated to raptors.

Raptors have been studied at a few plots already in the late 1950s and early 1960s in Estonia (Randla 1976, Lõhmus 1999, Tuule *et al.* 2011), but the monitoring has been making marked progress only since 1989 (Lõhmus 1999). The monitoring of the numbers of eagles was embarked upon at the beginning of 20th century, while monitoring of their productivity started in the 1980s (Randla 1976). Raptor monitoring at permanent study plots and monitoring of eagles became part of the national monitoring programme in 1994 (Lõhmus 1999).

The Estonian University of Life Sciences and University of Tartu provide a basis for academic raptor research in Estonia. The research interest covers different areas of raptor population ecology and conservation, such as population dynamics (e.g. Tuule *et al.* 2011, Väli *et al.* 2011), habitat selection (e.g. Lõhmus 2001, Lõhmus 2003b, Väli *et al.* 2004), telemetry studies (e.g. Väli & Sellis 2007, Sellis *et al.* 2007), population genetics and hybridization (e.g. Lõhmus & Väli 2001, Väli *et al.* 2010 & 2011), impacts of forestry on raptors (e.g. Lõhmus 2003b, 2005 & 2006, Rosenvald & Lõhmus 2003), etc.

There is, however, a shortage of information on the productivity of some species breeding in low densities (Lõhmus 1999 & 2004) and raptor populations living in Important Bird Areas (IBAs). These areas probably need periodic inventories, as there are no study plots

for monitoring raptors in most of them. The Ministry of Environment is now working, in co-operation with the EOS, to fill this gap of knowledge.

Priorities, capacity-building

In Estonia, there is an urgent need to increase efforts at study plots, to recruit more observers and/or change to more cost-effective methods for assembling adequate information on low-density species. There is also a need to increase regional co-operation for monitoring low-density raptors (specially migrating species), as populations of these species should be considered and monitored as one at least at the regional level. Development of co-operation and research at the national and European scales (especially on topics like wind farms impact, effects of pollutants, electrocution, etc.) should be the main priority of monitoring for raptors in Estonia.

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