Voluntary-based Bird Monitoring in Denmark

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Introduction

In 2006, Dansk Ornitologisk Forening (DOF/BirdLife Denmark) celebrates its 100th anniversary. When a group of dedicated and concerned bird lovers met in Copenhagen on 15 October 1906 they founded DOF as an organisation with the mission to enhance bird protection as well as to share the affection for birds with the wider Danish public. Since then conservation and information has been a dual mission for DOF. Probably, this historical decision is why DOF (13,000 members) is today the only ornithological society in Denmark (5 mio inhabitants) and holds all aspects of modern ornithology including twitchers, conservationists, amateur field ornithologists, scientists and garden bird lovers.

Over the last decades, DOF has developed into a modern, science-based green NGO with a sharp profile in the Danish public environmental debate. DOF's force is the large group of skilled and dedicated bird watchers that are willing to participate voluntarily in organised bird monitoring (see Fig. 1). A major step forward was the first national bird site survey in the 1960's (Ferdinand, 1971), followed by the first Danish atlas survey 1971-'74

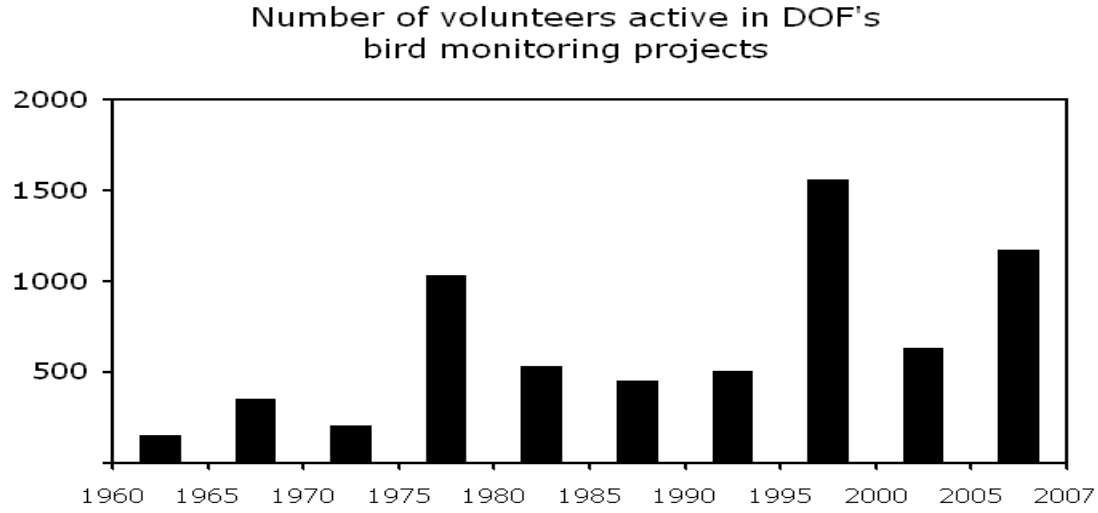

Fig. 1: The total number of volunteers active in DOF's monitoring projects given as estimates in 5-year periods.

(Dybbro, 1976), the Common Bird Census Programme launched in 1975 (Heldbjerg, 2006) and the second atlas survey 1993-'96 (Grell, 1998).

The need for sound knowledge about Danish birds – their trends, population sizes, distribution and important bird sites triggered DOF's monitoring activities. In her speech at DOF's Anniversary conference on 13 October 2006, the Danish Minister for the Environment, Mrs Connie Hedegaard, said that DOF is one of the most influential green NGO's in Denmark. What has brought us to this political recognition is probably the solid, science-based arguments used in lobby and advocacy work and produced by volunteers.

In this article the authors outline the present monitoring strategy of DOF/BirdLife Denmark.

A three-legged monitoring plan

In 2001, public support of the Common Bird Census Programme (CBC) was stopped for political reasons. It was felt in DOF that the voluntarily based monitoring was at a crossroads, and that the CBC as a corner-stone in DOF's monitoring had to be secured. Much inspired by the BirdLife species, sites and habitats approach, DOF outlined what we today call the three-legged monitoring strategy. The three legs being

- survey of rare and threatened breeding birds
- monitoring the most important bird sites
- following the population changes of the common birds

The main Danish habitats are monitored using indicators such as the farmland or the woodland bird indicator based on CBC data. To realise this ambitious strategy DOF needed a basic organisational structure and the support of hundreds of volunteers. A generous 5-year grant obtained in 2003 from the private Aage V. Jensen Charity Foundation made it possible to realise the plan. The running costs of the complete scheme is 300 000 € annually and it employs 4 full-time biologists.

Data used for policy work

It is crucial that the data are used to improve conservation. That is our motivation for doing monitoring – either we are volunteers or professionals. Therefore, informing members, decision makers and the wider public is an important task in the monitoring plan. The channels of information take many different forms: Websites, electronic newsletters as well as articles in membership magazines and printed reports (Dansk Ornitologisk Forening

2005).

An example of effective advocacy is the conservation agreement made between the Danish Ministry of the Environment and DOF in 2004, giving special attention to rare and threatened breeding birds. This ministerial agreement has provided national action plans for both the Red Kite (Skov- og Naturstyrelsen, 2005a) and for the threatened meadow birds Dunlin, Ruff and Black-tailed Godwit (Skov- og Naturstyrelsen, 2005b). Both the Ministry of the Environment and DOF are actively involved in implementing those plans.
In 2005, DOF's monitoring data were used to evaluate the designation criteria of the 113 Danish SPA's, and in 2005-'06 the national Danish Red List of birds (Danmarks Miljøundersøgelser, 2006) was equally revised using DOF's data.

The first 3-year Ministerial Agreement has recently been extended to comprise governmental support to the CBC and formalised inclusion of DOF's data in the public environmental monitoring programme (NOVANA). At this point, we deeply thank all the good colleagues in BirdLife who supported us in this process. No one mentioned – no one forgotten!

The official recognition of DOF's citizen science activities is not only a major step forward for the organisation itself but also a significant motivating factor for the volunteers. By formalising this cooperation we have also ensured that the huge amounts of bird data are being used for the benefit of bird protection in the best possible way, which has and will always be the overall objective of DOF's monitoring work.

DOF's survey of threatened and rare breeding birds (The 'DATSY-project')

Formerly, surveys of scarce breeding birds were made by dedicated individuals who based their work on historical data obtained by correspondence with local bird-watchers - rarely by systematic organised surveys. Such retrospective avifaunistic papers were regularly published in DOF's scientific journal Dansk Ornitologisk Forenings Tidsskrift from the 1950's to 1970's. The first comprehensive systematic survey of scarce Danish breeding birds had to await the implementation of the EC Wild Bird Directive in the beginning of the 1980's. From this arose a public need for present data on population sizes and trends of the Danish Annex 1 species. Accordingly, DOF was engaged to conduct a national survey and volunteer field ornithologists were monitoring those species including a number of specialist groups (terns, raptors, storks, etc.) in the so-called Project Status

(Sørensen & Dybbro, 1985).

After a period with no organised national surveys, it became clear that DOF needed a better knowledge of the trends of the scarce Danish breeding birds. A project organisation was established and in 1998 the DATSY project was launched as a voluntarily based survey. Since 1999, the survey has been sponsored by the Aage V. Jensen Charity Foundation.

The objective is to

- collect high-quality data on the rare and threatened breeding birds to establish the population size once a year
- use the data to inform the public and thereby enhance public attention on our mutual responsibility to protect the endangered species and their habitats
- publish an annual status report
- engage volunteer field ornithologists in an important national survey

Organisation

The project is organised as a network of voluntary species coordinators. Presently, 38 species coordinators are participating in the project and they collect survey data from a much larger group of field ornithologists. After the breeding season those data are sent to a central coordinator, who prepares the final report. The national coordinator employed in DOF's secretariat is responsible for the project on a daily basis and has an important task in servicing the network of species coordinators and observers as well as processing and publishing the results.

In the first phase of the DATSY-project (1998-2003), the survey comprised 57 species on the national Red List. In the second phase (2004-'08), the species list has been reduced to 42 species selected primarily by their presence on Annex 1 of the EC Wild Birds Directive and a few other species of national interest (Table 1). Since 2004, producing monitoring manuals for each species has enhanced the survey quality. So far (late 2006), 7 monitoring manuals have been published.

Table 1: Species included in the monitoring by DATSY and the latest breeding population estimate (bp = breeding pairs; singing = number of singing birds) and trend of the population development (disappeared (▼*), decreasing (▼), status quo (►), fluctuating (~), increasing (▲), new breeding bird (▲*), unknown (?)) during the project period.

Species	Monitoring period	Latest population estimate		Trend
Slavonian Grebe *Podiceps auritus*	1998-2003	2003:	0 bp	▼*
Fulmar *Fulmarus glacialis*	1998-2006	2005:	0 bp	~
Black Stork *Ciconia nigra*	1998-2006	2005:	1 bp	►
White Stork *Ciconia ciconia*	1998-2006	2005:	1 bp	▼
Spoonbill *Platalea leucorodia*	1998-2006	2005:	21 bp	▲
Whooper Swan *Cygnus cygnus*	2002-2006	2005:	1 bp	▲*
Barnacle Goose *Branta bernicla*	1998-2006	2005:	504 bp	▲
Wigeon *Anas penelope*	1998-2003	2003:	2 bp	►
Red-crested Pochard *Netta rufina*	1998-2006	2005:	12 bp	▲
Goldeneye *Bucephala clangula*	1998-2006	2005:	64-68 bp	►
Goosander *Mergus merganser*	1998-2006	2005:	40-53 bp	▲
Red Kite *Milvus milvus*	1998-2006	2005:	37-39 bp	▲
White-tailed Eagle *Haliaetus albicilla*	1998-2006	2006:	15 bp	▲
Hen Harrier *Circus cyaneus*	1998-2006	2005:	0 bp	▼
Montagu's Harrier *Circus pygargus*	1998-2006	2005:	28 bp	▼
Golden Eagle *Aquila chrysaetus*	1998-2006	2005:	3 bp	▲*
Osprey *Pandion haliaetus*	1998-2006	2006:	1 bp	▼
Hobby *Falco subbuteo*	1998-2006	2005:	15-19 bp	▲
Peregrine Falcon *Falco peregrinus*	1998-2006	2005:	1 bp	▲*
Black Grouse *Tetrao tetrix*	1998-2003	2003:	0 bp	▼*
Quail *Coturnix coturnix*	1998-2003	2003:	638 singing	~
Spottet Crake *Porzana porzana*	1999-2006	2005:	44 singing	~
Corncrake *Crex crex*	1998-2006	2005:	97-113 singing	~
Crane *Grus grus*	1998-2006	2005:	58-66 bp	▲
Kentish Plover *Charadrius alexandrinus*	1998-2006	2005:	36 bp	~
Golden Plover *Pluvialis apricaria*	1998-2006	2005:	2 bp	▼
Green Sandpiper *Tringa ochropus*	2001-2006	2005:	17-21 bp	►
Wood Sandpiper *Tringa glareola*	1998-2006	2005:	66-67 bp	▼
Turnstone *Arenaria interpres*	1998-2006	2003:	50-52 bp	▲
Mediterranian Gull *Larus melanocephalus*	1998-2006	2006:	19 bp	▲*
Little Gull *Larus minutus*	1998-2006	2005:	1 bp	~
Gull-billed Tern *Gelochelidon nilotica*	1998-2006	2005:	2 bp	▼
Little Tern *Sterna albifrons*	1998-2003	2001:	464-500 bp	▼
Sandwich Tern *Sterna sandvicensis*	2004-2006	2005:	4300-4500 bp	?
Black Tern *Chlidonias niger*	1998-2006	2005:	54-59 bp	►
Barn Owl *Tyto alba*	1998-2006	2005:	277 bp	▲
Little Owl *Athene noctua*	2003-2006	2005:	60-75 bp	▼
Eagle Owl *Bubo bubo*	1998-2006	2005:	28-29 bp	▲
Short-eared Owl *Asio flammeus*	1998-2006	2005:	3 bp	~
Tengmalm's Owl *Aegolinus funereus*	1998-2006	2005:	0-1 bp	►

Species	Monitoring period	Latest population estimate		Trend
Bee-eater *Merops apiaster*	1998-2006	2005:	0 bp	~
Wryneck *Jynx torquilla*	2001-2003	2003:	7-25 bp	▼
Lesser Spotted Woodpecker *Dendrocopos minor*	1998-2003	2003:	16-49 bp	?
Crested Lark *Galerida cristata*	1998-2006	2005:	1-2 bp	▼
Tawny Pipit *Anthus campestris*	1998-2006	2005:	2-4 bp	▼
Dipper *Cinclus cinclus*	1998-2006	2006:	1 bp	~
Bluethroat *Luscinia svecica*	1998-2006	2005:	147 bp	▲
Stonechat *Saxicola torquata*	1998-2003	2003:	28-30 bp	~
Savi's Warbler *Locustella luscinioides*	1998-2003	2003:	8-20 singing	~
Great Reed Warbler *Acrocephalus arundinaceus*	1998-2003	2003:	5-9 singing	~
Barred Warbler *Sylvia nisoria*	1998-2003	2003:	0-1 bp	▼*
Greenish Warbler *Phylloscopus trochiloides*	1998-2003	2003:	1-2 bp	~
Firecrest *Regulus ignicapillus*	1998-2003	2001:	14-16 bp	?
Golden Oriole *Oriolus oriolus*	1998-2003	2003:	4-11 bp	~
Grey Shrike *Lanius excubitor*	1998-2006	2005:	17-20 bp	~
Nutcracker *Nucifraga caryocatactes*	1998-2003	2003:	0 bp	▼*
Serin *Serinus serinus*	1998-2003	2003:	8 bp	~

Other activities

Breeding records are being collected using DOF's Internet database (DOFbasen). A webpage has been produced for each of the surveyed species edited by the species coordinators themselves and, furthermore, a project-specific site at DOF's website (http://www.dof.dk/datsy) is used for communication and distribution of newsletters and published material for the use of participants as well as the general public.

Action plans

It is the intention that the acquired knowledge of the project should be used to produce action plans for the most endangered species. So far, action plans for White Stork (Grell, 2000), Golden Plover (Heldbjerg & Grell, 2002), Crested Lark (Grell *et al.*, 2002) and Red Kite (Grell, 2003) have been produced along with a special management plan for improved protection of Dunlin (subspecies *C. a. schinzii*), Ruff and Black-tailed Godwit (Thorup, 2004). In the last few years, further implementation of formerly published action plans has been given higher priority than the production of new action plans.

Ups and downs

In the course of the survey period we have witnessed quite significant changes in the Danish avifauna. The most critically endangered Danish bird species are those living in different types of open habitats such as meadows, dry grasslands, heaths or dunes. The endangered species of those habitats are suffering from a general impoverishment of the habitat quality. A negative impact is the cessation of extensive use of meadows and dry grasslands, e.g. through grazing, that is no longer an integrated part of Danish arable land management. Furthermore, those habitats are negatively influenced by the increasing amounts of airborne nitrogen pollution. In the survey period two once numerous Danish breeding birds, Black Grouse and Barred Warbler, have completely vanished from the Danish fauna. White Stork, Golden Plover, Gull-billed Tern, Crested Lark and Tawny Pipit (see Fig. 2) are on the verge of disappearing. For all these mainly open land species a long-term negative population development has continued throughout the period, and this stresses the need for improved protection and management plans for their main habitats.

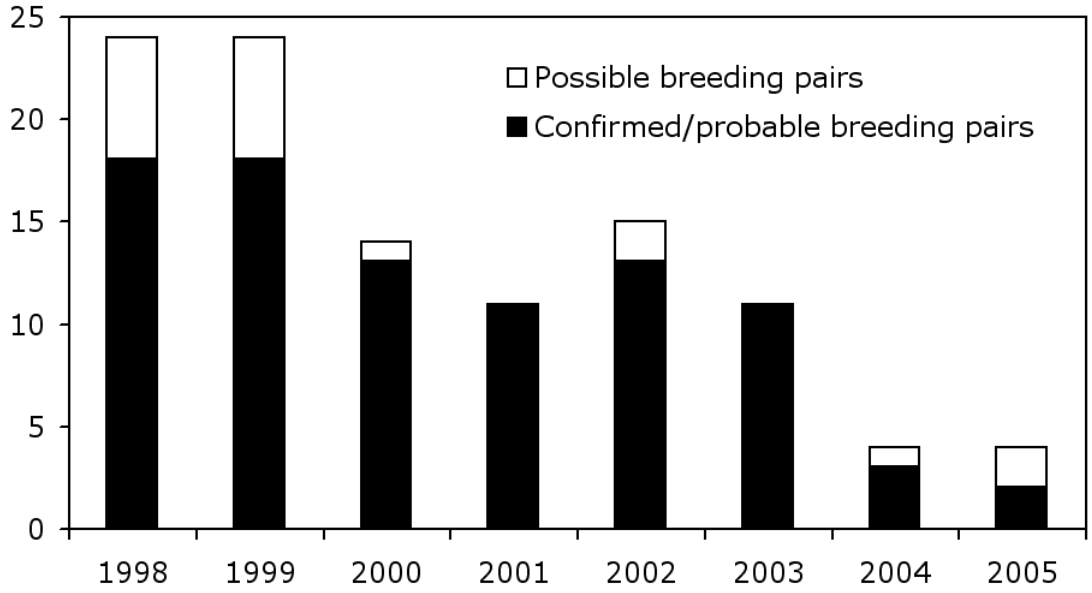

Fig. 2: The Danish breeding population of Tawny Pipit Anthus campestris *in Denmark 1998-2005.*

A more positive change is the colonization or re-colonization of several species during the last decades: Spoonbill (first breeding 1996), Whooper Swan (2002), Red-crested Pochard (2000), White-tailed Eagle (1995, see Fig. 3), Golden Eagle (1999), Peregrine Falcon (2001), Mediterranean Gull (2000), Bee-eater (1997-2005) and Southern Bluethroat (1992). Corncrake and Quail occurred very scarcely around 1990, but have since shown a

remarkable increase. The survey period has produced some record-breaking counts with more than 600 singing Quails (2000 and 2003) and 500 singing Corncrakes (2003).

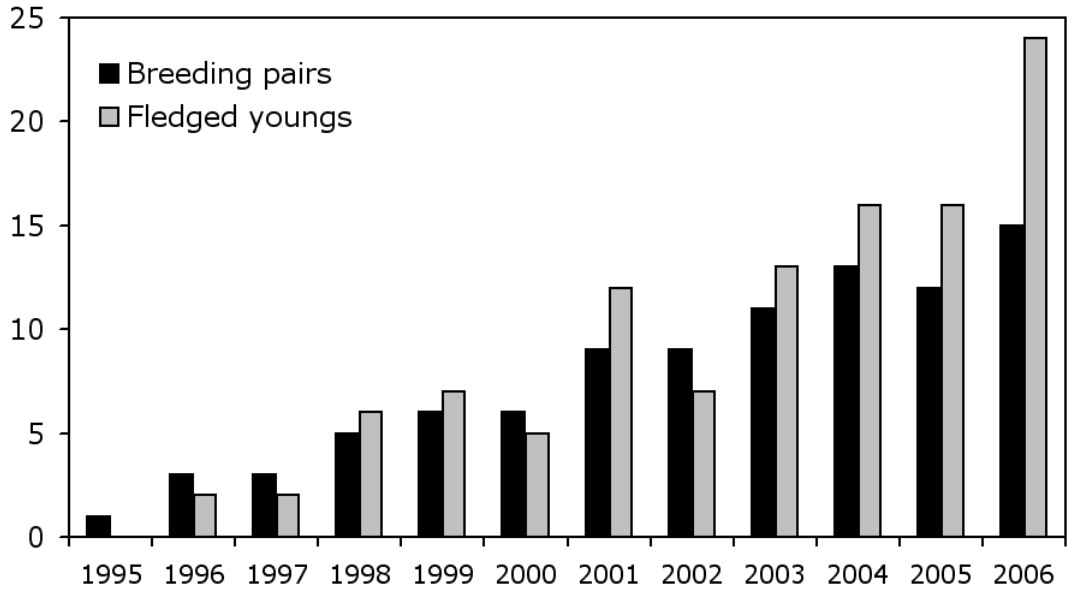

Fig. 3: The Danish breeding population of White-tailed Eagle Haliaetus albicilla *and their breeding success since the recolonization in 1995.*

The IBA Caretaker Project

In 2003, DOF launched the IBA Caretaker Project. In this project, volunteers are monitoring the most important bird species at the most important bird sites in the country. By November 2006, 490 ornithologists had volunteered to monitor 114 of Denmark's 128 IBA's and 34 other sites. Until 2008 they will improve our knowledge and optimise conservation actions at these locations.

Three main elements

The three elements of the Caretaker Project are:

- monitoring selected bird populations in the Important Bird Areas (IBA's)
- improved conservation of IBA's in cooperation with landowners and authorities
- education of the public about the importance of IBA's, through information on websites, public excursions, etc.

The sites included in the project can be divided in three categories:

- sites qualifying as IBA's under BirdLife's internationally recognised criteria
- potential IBA's, apparently fulfilling the international IBA criteria, but only recently discovered by the caretakers
- DOF's own reserves, sites near towns, and newly restored wetlands, which all three are ideal for informing the public about nature conservation.

Social aspects and teamwork are major elements in this project, and participants are offered training in bird monitoring, nature policies, website maintenance, public relations and other relevant subjects.

IT plays a role

By November 2006, 100 of the project sites have their own website where interested people can keep up to date with the most recent information about the sites. DOF is providing website templates to the IBA caretakers, which include information about the area's size, threats, conservation, etc. Other information, recent news and pictures are administered and maintained by the caretakers themselves. Moreover, bird observations based on extracts from the DOF database (see below) are presented on the site.

What is monitored

In particular, DOF volunteers are monitoring sites where 1 % of water-bird fly-way populations regularly roost, or where 20,000 or more of any water-bird species are found, or sites where species of European significance breed. They also monitor migration bottleneck sites where at least 3,000 raptors and cranes pass each season.

A monitoring example is the yearly counts of swans and geese in mid-January. Counts are made all over the country by the ornithologist network of the National Environmental Research Institute and DOF's IBA Caretaker Project (the result for Whooper Swan in 2006 is shown in Fig. 4).

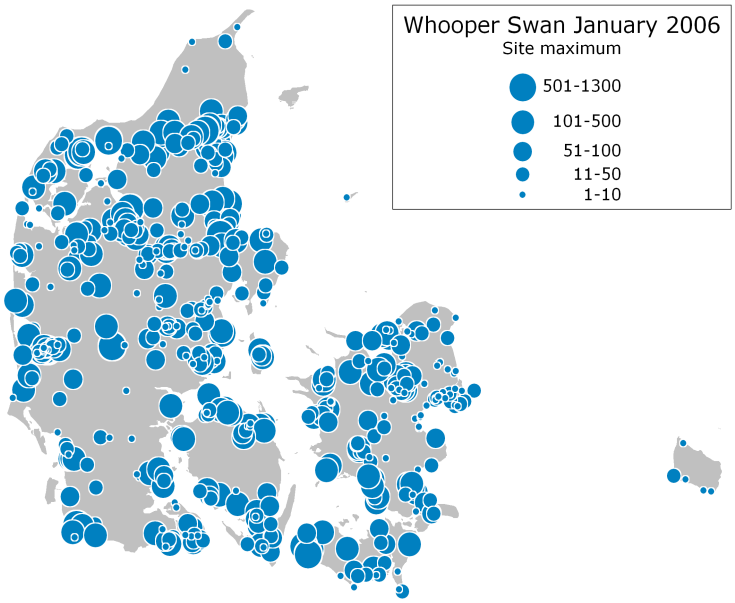

Fig. 4:Site maxima of Whooper Swan Cygnus cygnus *in January 2006 as counted by the ornithologists network of the National Environmental Research Institute and DOF's IBA Caretaker Project. In total 40,000 individuals were counted.*

Two examples of Danish IBA's and their bird species

The Danish part of the Wadden Sea is the country's most important non-marine IBA, regularly holding millions of water-birds. The IBA is intensely monitored by local authorities in the Danish/German/Dutch so-called Trilateral Wadden Sea Cooperation. However, the local IBA caretakers, who have a thorough knowledge of the site, have pinpointed a number of waterbird occurrences, which fulfil the IBA criteria, but are not covered by the authorities. Thus, the caretaker group has made a 4-year plan for the monitoring of these occurrences, and the results reported until now are shown in Table 2.

Table 2: Coordinated wader counts in the Danish part of the Wadden Sea by the local IBA caretaker group.

Year	Species	Date of count	Total number of birds	Fraction of fly-way population
2004	Curlew *Numenius arquata*	March 3	8,875	2.1 %
2005	Grey Plover *Pluvialis squatarola*	May 20–25	5,977	2.4 %
	Redshank *Tringa totanus*	July 25–Aug. 5	13,868	5.5 %
	Avocet *Recurvirostra avocetta*	July 25–Aug. 5	8,003	9.6 %

Almindingen Forest on the island of Bornholm in the Baltic Sea is the third largest forest in Denmark and has many important breeding species, including about 5 pairs of Tengmalm's Owl *Aegolius funereus*, and is the only site in the country for this species (see Fig. 5). The biggest caretaker group in the project until now, counting more than 30 members, is among others monitoring this species, which has to take place on (hopefully) moon-lit nights in February and March.

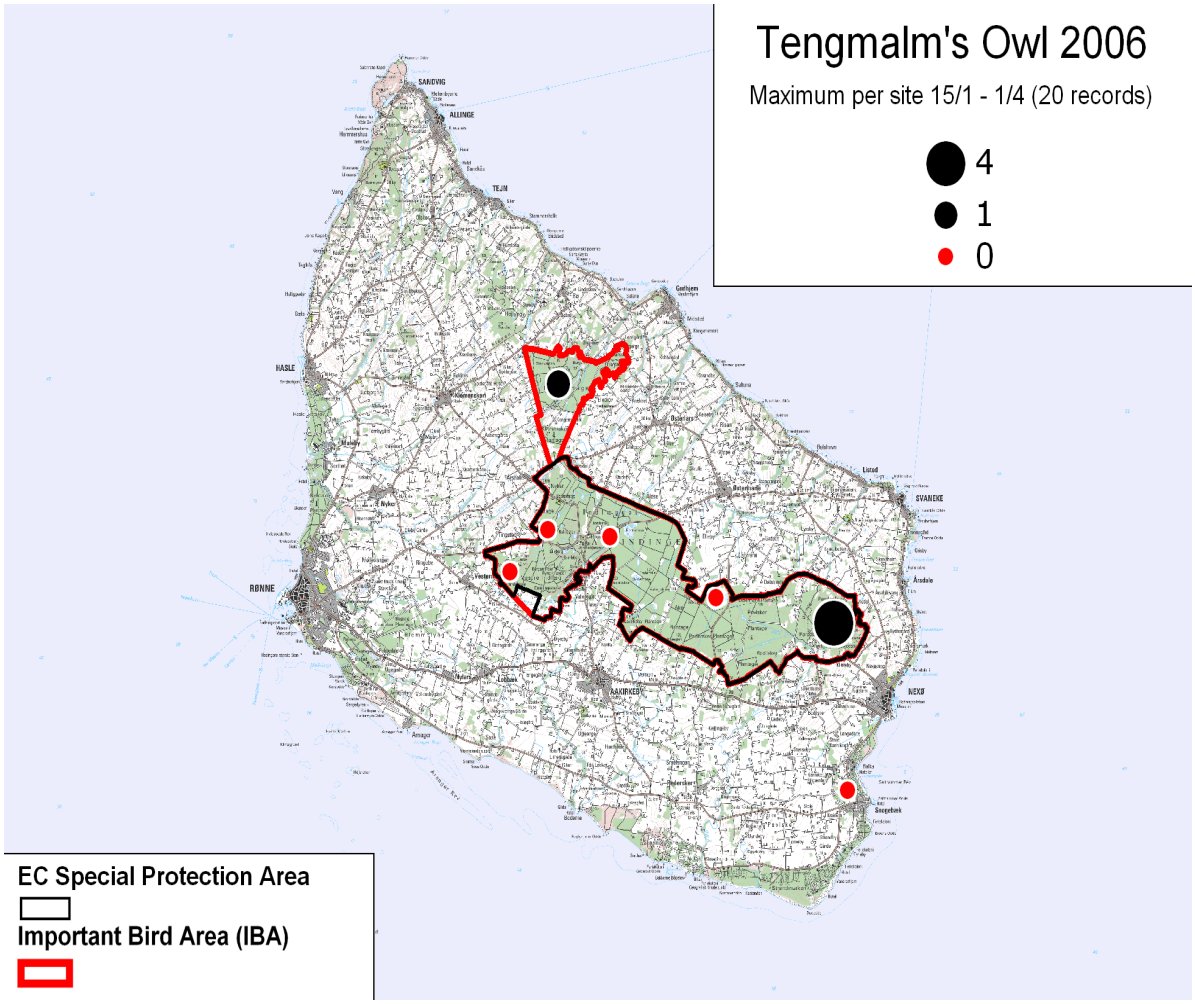

Fig. 5: Breeding records of Tengmalm's Owl, Aegolius funereus*, at Bornholm in the breeding season of 2006. The map also shows where listening for the species has been carried out unsuccessfully, and it is marked by a red line where the local caretaker group has decided to enlarge the IBA (in relation to the corresponding EC Special Protection Area) because of a steady occurrence of the species in this part of the forest, outside the SPA.*

The Common Bird Census

The Common Bird Census in Denmark was initiated in 1975. Point Count Census in a free choice scheme is the chosen method and volunteers among the members of BirdLife Denmark (DOF) do all monitoring. The Common Bird Census consists of a breeding-bird survey and a winter-bird survey, both based on routes with 10-20 points and monitored once per season.

The number of routes is about 370 in the breeding season and about 270 in winter. This is the highest level ever, which is a result of a focus on the achieved results from the first 30 years communicated to the members in popular papers and in presentations at meetings, seminars, etc.

There has been no governmental support of the monitoring in 2002-2006. After 5 years of lobbying, we have now succeeded in regaining government support and the Minister for the Environment signed an agreement for the next five years during the celebration of DOF's 100th anniversary in October 2006. As biodiversity indicators the indices will make up a considerable contribution to monitor whether Denmark can fulfill the 2010 obligations to stop the decrease in biodiversity.

Results

Each year we produce TRIM-indices for nearly 100 breeding-bird species and about 75 winter-bird species; the most increasing and decreasing species are shown in Table 3.

Table 3: The species with the largest increasing or decreasing trends (mean annual percentage change per year) during 1996-2005 in the breeding time and at winter respectively.

	Breeding	%/yr	Winter	%/yr
Increasing	Cormorant *Phalacrocorax carbo*	14.0	Canadian Goose *Branta canadensis*	25.9
	Raven *Corvus corax*	9.0	Greylag Goose *Anser anser*	20.9
	Goldfinch *Carduelis carduelis*	8.8	Kingfisher *Alcedo atthis*	10.5
Decreasing	Yellow Wagtail *Motacilla flava*	-5.4	Shellduck *Tadorna tadorna*	-6.8
	Whinchat *Saxicola rubetra*	-5.1	Twite *Carduelis flavirostris*	-4.7
	Sand Martin *Riparia riparia*	-5.1	Rough-legged Buzzard *Buteo lagopus*	-4.3

Of the species having a significant trend we see an increase for 47 % of the breeding birds and 53 % of the winter birds. For 57 species both a breeding-bird index and a winter-bird index are calculated (see Fig. 6), and the two sets of indices are mutually correlated (Pearson r = 0.563, n = 57, P<0.0001). Nine of these species are considered as being genuine residents and among these we find that the two sets of indices are closely related (r = 0.927, n = 9, P = 0.0003), and we conclude that the indices achieved by the Common Bird Census do track the populations.

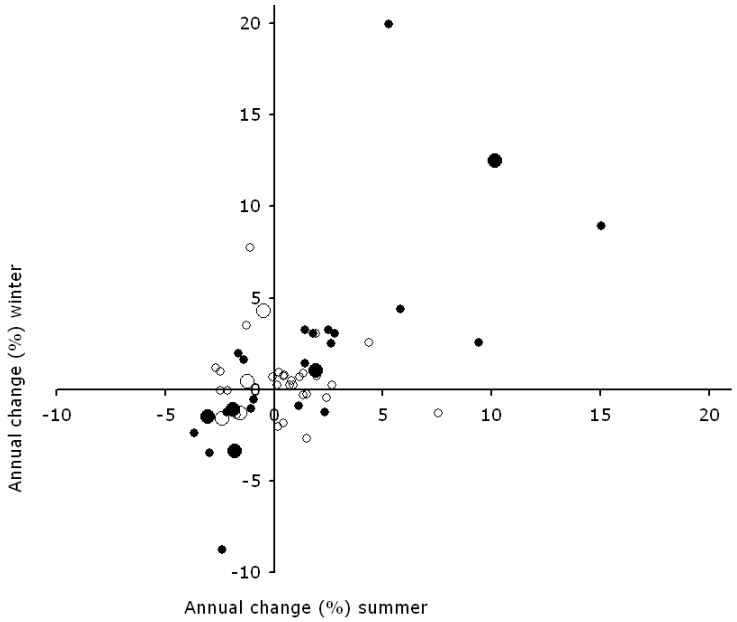

Fig. 6: Comparison of the mean annual change (%) in respectively, the breeding-bird index and the winter index for 57 species for which both indices are available. 25 species have significant trends in both seasons (filled circles). 9 species are regarded as genuine residents (large circles; Grey Partridge, Pheasant, Green Woodpecker, Marsh Tit, Crested Tit, Nuthatch, Raven, House Sparrow and Corn Bunting).

We compared the relevant indices with the very few other high quality population estimates in Denmark to see if they correlated. We found a significant correlation between the Cormorant *Phalacrocorax carbo* breeding-bird index and the number of counted nests in Denmark 1983-2005 (Eskildsen, 2005; Fig. 7) as well as between the Grey Partridge *Perdix perdix* breeding-bird index and the annual hunting bag in 1976-2004 (Asferg, 2006; Fig. 8). These examples illustrate that the Danish Common Bird Census produces population indices with a quality comparable to the best other estimates in Denmark.

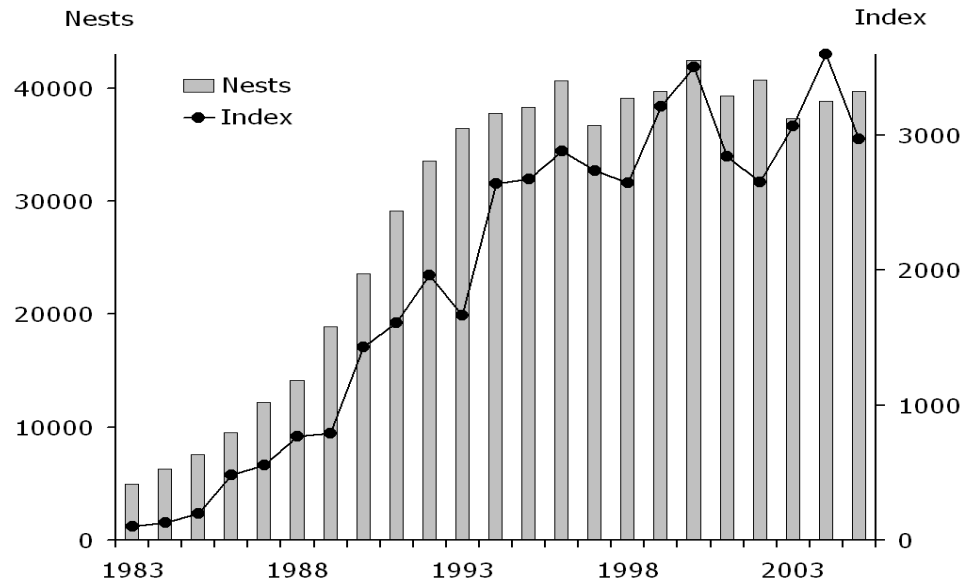

Fig. 7: The Cormorant Phalacrocorax carbo *breeding-bird index in Denmark is significantly correlated (Pearson product moment correlation r=0.957; n=23; p<0.0001) to the annual nest counts.*

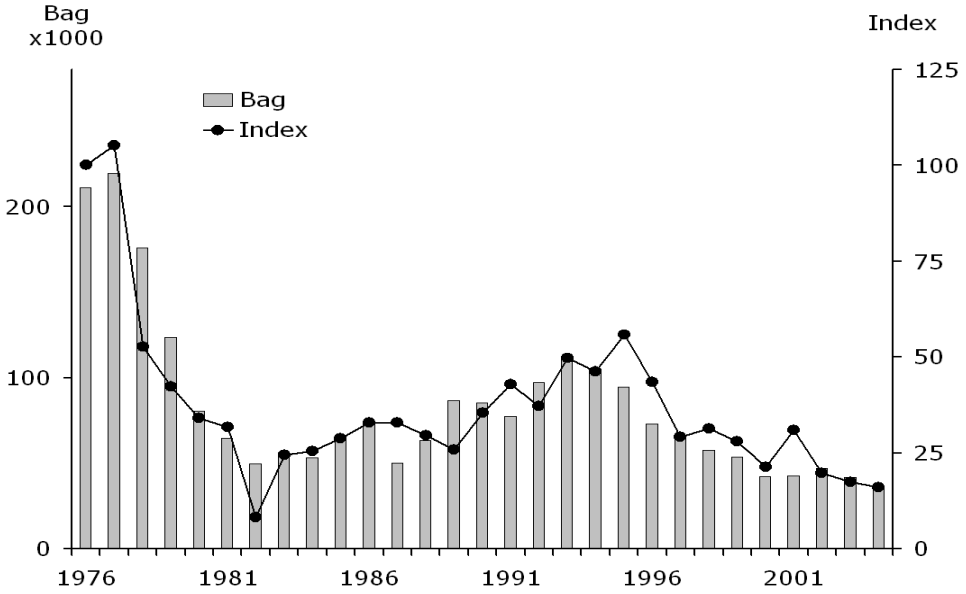

Fig. 8: The Grey Partridge Perdix perdix *population in Denmark based on the breeding-bird index is significantly correlated (Pearson product moment correlation r=0.920; n=29; p<0.0001) to the annual bag of shot birds*

In the last few years, the results of the Common Bird Monitoring are increasingly being used in relation to conservation and we can expect an improved cooperation with the Government in the near future, which will hopefully secure optimal use of the census data.

The DOF database "DOFbasen"

DOFbasen is DOF's Internet-based database for bird observations. The purpose of the database is to give the Danish bird-watchers an opportunity to report and share their bird observations and counts. Modules have lately been added to make it possible also to use DOFbasen for reporting the more specialized bird counts made as part of DOF's monitoring projects. All data are gathered by volunteers and can be accessed by the public on the website www.dofbasen.dk.

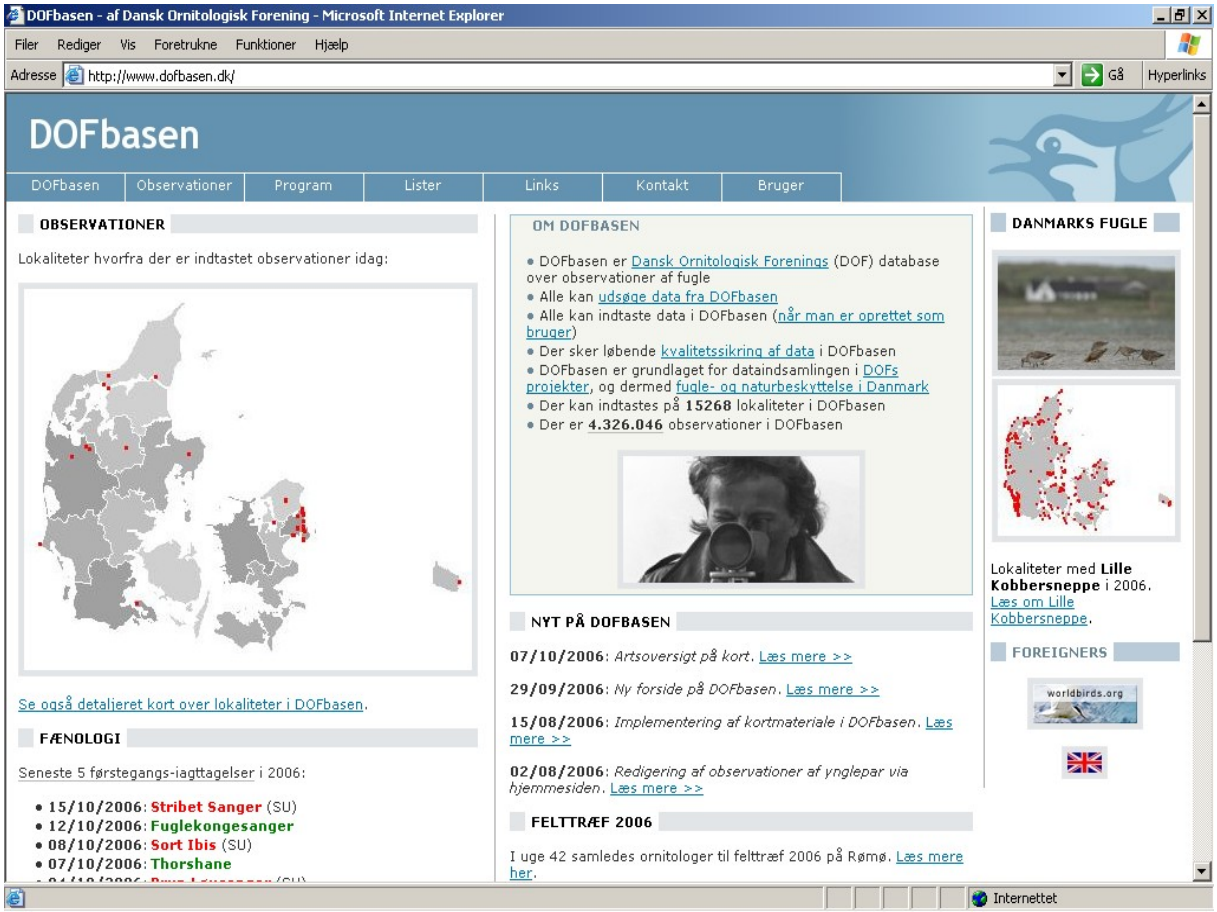

Fig. 9: The front page of www.dofbasen.dk, amongst other showing a map of the sites where data have been entered today and the latest species arrivals to Denmark.

Software and a website

DOFbasen consists of two central parts: a locally installed software and a website (see Fig. 9). The software is used for entering observations using predefined lists of localities, species names, behavioural categories, etc. Access to the internet is needed to upload the data to the central database, but the data entry can be made offline. On the website the observations made by all users can be accessed using search tools. Many features are available here, for instance search results shown on maps, arrival dates for the migratory species, easy extracts of rare bird observations, top list of most active observers and filters to show only IBA-relevant observations. The website is also where the software can be downloaded, and user support is available if needed. Anyone can access the website, but a username and password are needed to report observations.

The developing team

Two programmers are attached to DOFbasen, one maintains the website and one is responsible for the programme. The central coordinator plans new developments and improvements of DOFbasen together with the 12 regional coordinators. The latter are volunteers and, furthermore, responsible for adding users on request and maintaining the local site list. They support users and run regional introduction courses. The coordination group works on the basis of an email group and annual meetings.

To ensure high data quality, a group of 6 volunteers, including representatives of DOF's Rarity Committee, was established in 2006. The group follows records of rare species as well as common ones, and reacts on all irregularities of phenology, habitat and region. By contacting observers they ensure that typing errors are corrected and that descriptions of rare birds are sent to the Rarity Committee. Furthermore, the users can send emails to other users, and the members of the forum are therefore able to assist each other in maintaining the correctness and quality level of the data.

The data

DOFbasen went online in its present form in May 2002. Since then, 1,900 user profiles have been created and 4.4 million observations entered (see Fig. 10). In 2006 so far, more than 1,000 people have reported 500,000 observations from 6,800 different sites (per mid-November). The number of users and amount of data entered every year have been increasing, but now seems to have been stabilized around 550-600,000 observations per year.

The website has an average of 40,000 page views per day.

In other words, DOFbasen has become an important and fundamental tool for the majority of the active Danish bird-watchers. It is used for observations of common birds as well as rarities, random observations of few individuals and thoroughly made counts of large flocks from small sites as well as huge and important bird areas. The database is used as a supplement to the sms-based rarity reporting system in sharing information between field ornithologists and as a quick reference for taking the pulse on the birding situation in Denmark as well as to gain information on individual birds and sites.

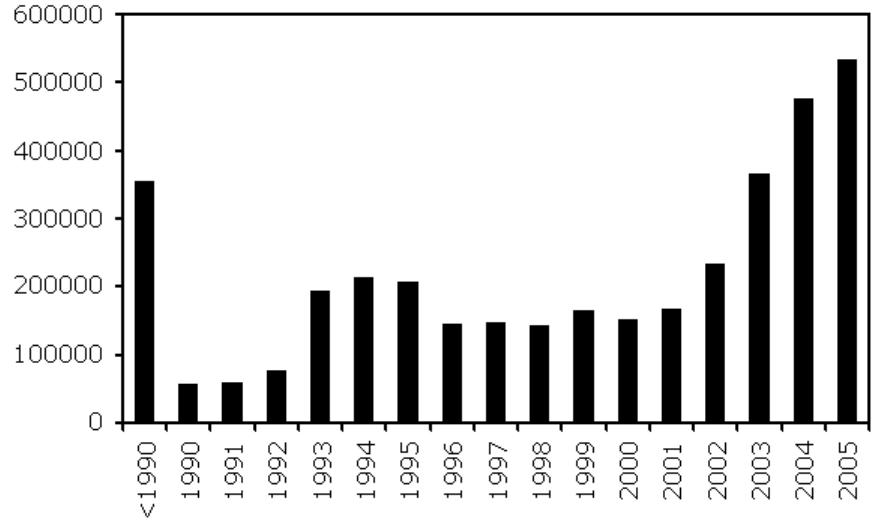

Fig. 10: Number of observations entered in DOF's Internet based bird database "DOFbasen" grouped by observation year.

Communication of the results from the projects to the public

Each project has its own website mainly used for communication from the project management to the participants and the public. Another important part of the project descriptions has been the communication of the project results using subsets of websites linked in a network and, as a very new approach, the majority of these websites are edited and maintained by the volunteers themselves. This is done by simply logging in on the website and adding text in templates (Content Management System).

Three sets of websites have been established:

- **Important bird areas.** At present, 100 sites have their own website where the local caretakers can write site descriptions. Also shown are hints on access roads and observation points, news, upload pictures,

latest counts, etc. Maps showing site boundaries are added by the central coordination (www.dofbasen.dk/IBA).

- **Rare and threatened breeding birds.** 41 species each have their own website where the species coordinator can add text about the breeding ecology of the bird, latest status on the population, monitoring instructions, construction plans for building nesting boxes (for owls) and contact information to report newly discovered breeding pairs (www.dofbasen.dk/DATSY).
- **Birds of Denmark.** 220 species each have a web page giving a brief and general description of the bird. Global and Danish breeding range, wintering sites, migration pattern, feeding ecology and population changes. The main purpose of the sites is to present the specific data gathered by DOF over many years of survey, and chiefly the indices produced by the common bird census programme since 1975 and the breeding maps produces in the atlas surveys in the 1970's and 1990's (www.dofbasen.dk/ART).

These websites are all automatically linked together (see Fig. 11) with links from an IBA to all species important in that area and the latest entries of observations from the site in DOFbasen. From the species sites there are links to all relevant IBA's and the latest observation entered in DOFbasen of that species. When searching observations in DOFbasen, relevant links appear if an active website of the involved species or site exists.

The volunteers have shown great interest in maintaining the websites regarding IBA's, whereas the activity in editing the websites about the rare

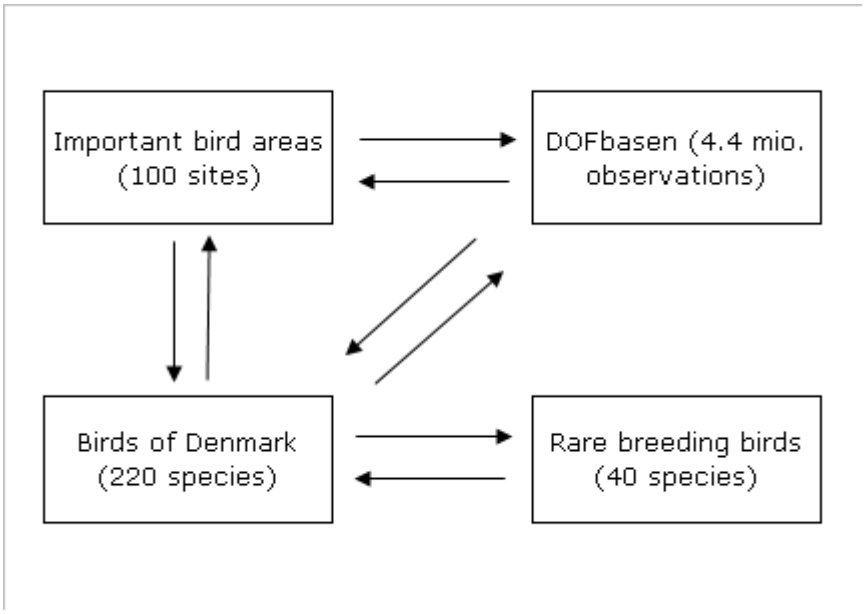

Fig. 11: Diagram showing the linking between the different subsets of websites in DOF's projects.

breeding birds has varied. The visiting numbers have been higher than expected, with the pages about the birds of Denmark being the most popular together with the IBA websites. In all, the websites have around 50,000 page views per month, excluding DOFbasen.

Contact information and latest publications

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Rare and threatened breeding bird programme (DATSY)

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References
Grell et al (2004)
Nyegaard & Grell (2006)

Web
www.dof.dk/datsy (The project website)
www.dofbasen.dk/DATSY (Info about the species covered by the project)

Caretaker Project

Contact
thomas.vikstroem@dof.dk

References
Vikström, T. (2004)

Web
www.dof.dk/caretaker (The project website)
www.dofbasen.dk/IBA (Info about the IBA's)

Common Bird Census

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Heldbjerg, H. (2006).
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Web
www.dof.dk/punkt (The project website)
www.dofbasen.dk/ART (Info about the species)

DOFbasen

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Web
www.dofbasen.dk

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