

**Action plan
for the conservation of endangered species of birds**

Corncrake *Crex crex*



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1.0 Why draw up a plan to save the corncrake

Up until about 1900, corncrakes were common birds both in Denmark and in the rest of Europe. However, intensive farming along with the introduction of fast combine harvesters has led to the decline of the corncrake population in its entire distribution area.

Today, the corncrake is the only Danish breeding bird which is endangered on a world-wide scale and which appears on the *IUCN's* latest *red list*. IUCN is the world's largest nature conservation organisation and the organisation's red list applies to species on a global scale.

In addition to this, the corncrake is included in the *EU's directive for the protection of birds* as one of the threatened species within the EU countries and one for which particular protective measures are to be implemented (Annex I species).

The species is also included in the *Bern and Bonn conventions*. In the Bern convention on the protection of Europe's wild animals and plants, the corncrake is listed as a species that must be very strictly protected, list II. In the Bonn convention on protection of migratory species of wild animals, the corncrake is listed in one of the categories of animals selected for protection by international agreement.

In Denmark, the corncrake was mentioned on the latest *Danish red list from 1997* as having disappeared because it was believed that there were no permanent breeding pairs left in the country. Since that time, there has been an increase in the number of sightings of corncrakes in Denmark. We can assume that this is connected with the favourable conditions current in Eastern Europe, where the large agricultural collectives have almost ceased to operate. Within the next few years, Denmark has a historic chance of getting the corncrake back as a regular Danish breeding bird.

Finally, it must be mentioned that the member countries in the Biodiversity Convention, which includes Denmark, are under an obligation to encourage the re-establishment of endangered species by making plans and administrative strategies.

This action plan for the corncrake can be regarded as a continuation of the above. The purpose of the strategy is to develop and apply efforts to save this endangered bird in Denmark.

2.0 Background

The corncrake was once part of the scenery in the Danish agricultural areas. Its characteristic song, which could almost be described as a high-pitched rasping sound, could once be heard in many places in the open country. In this action plan, its song will be described as the *crex*, after the corncrake's Latin name *Crex crex*.

2.1 Distribution

The species is widespread over the whole of the Eurasian area from Norway in the north to Spain in the south and from Russia in the east and to Ireland in the west. Approximately half of the global breeding population is found in Europe though the greatest breeding occurrences are in Russia, Poland and the Baltic countries.

In Denmark, the corncrake was a common bird until around 1930, but from the 1960s the only permanent breeding pairs to be found were in Skjern River Valley, Varde River Valley and Store Vildmose, and from the 1970s they were only found in Store Vildmose, where apparently breeding birds remained until 1983. After this, the species has only appeared at irregular intervals in different areas around the country.

2.2 Habitat

The corncrake's natural habitats are to be found in the driest areas of the large fens, grassy peat bogs and other marshy, relatively open, grassy lowland areas with few or no bushes. In Denmark and in most other places in Europe, the corncrake has gradually adapted to cultivated land as their areas of natural habitat have been reduced.

The corncrake lives almost exclusively in vegetation that is at least 20 cm high and reaches a maximum of 50 cm, in which it can hide. These conditions apply from when the bird arrives in Denmark in the middle of May until it flies away again in September. At the same time the corncrake prefers less dense vegetation, which enable it to move around freely. If the meadow has an abundance of withered stems from weeds, the grassy vegetation will stay relatively open and the bird's chances of survival are improved (table 1).

Even though grazing or hay harvests are essential requirements for the corncrake's presence, this bird will not be found in meadows that are intensively cut or intensively grazed.

It has been noticed that when the corncrake arrives in Denmark, it stays mostly amongst vegetation consisting of perennial herbs. Iris, canary reed, common reed, dock leaf and nettle are examples of flora that frequently occur in the corncrake's habitat. These plant species have all relatively rigid stems and their presence indicates an area with a rapid turnover and many insects. Later in the summer, from the middle of June when the grass has reached a height of 20 – 35 cm, the corncrake moves into the hay meadows.

In the course of the summer, the corncrake can also move out into other areas where the vegetation meets the bird's needs later on in the growing season.

Spring cornfields, clover meadows and pastures have earlier been described as the bird's preferred habitats. However, today most of the north western European corncrakes are found in water meadows, no doubt because vegetation is high throughout most of the breeding season. The soil moisture in itself is thought to be of less importance. However, the corncrake does not live in very marshy areas or in areas with open surface water.

The breeding territory itself is often just a few hectares. However, the corncrake is a gregarious bird and prefers to breed near its own species. If it is not possible to create a large area with space for

several breeding territories, it is important that patches with corncrake-friendly activity are found within earshot of each other so that each group of corncrakes can hear and be heard by the birds of one or more other colonies.

Table 1. The corncrake's physical settings (Ole Thorup, 1999, Heilmann & Manniche 1939, Stowe & Hudson 1988, Stowe et al. 1993, Schäffer & Munch, 1993, Niemann 1995)

<i>Habitat</i>	<i>Moisture</i>	<i>Hay harvest</i>	<i>Other</i>
Patchwork landscape of damp, not fertilised hay meadows and areas rich in vegetation (common reed, nettle, canary reed, iris)	High water table in the meadows is, at any rate indirectly, of importance in ensuring extensive use and late hay harvest	Mowing after around 1st August to ensure that no more than 25% of the young are lost when mowing. Mowing from the centre of the field and outwards or from one end. An unmown zone is left behind	Breeds socially, and the presence of several males encourages breeding. An area that is set aside for the corncrake needs to be a reasonable size

2.3 Biology

Migration

Corncrakes are migratory birds and spend the winter in Africa, south of the equator. In spring, during the month of May, they arrive in Denmark. The autumn migration starts in August and continues until October. In September, most of the birds arrive at Africa's north coast, though often they do not arrive at their proper wintering habitats south of the Sahara until December.

Food

Both adults and their young feed on a wide variety of vegetable and animal food. Investigations have shown that around 80 % of the corncrake's food consists of small animals, mostly insects, whereas around 20 % consists of vegetable food, mostly grass seeds. Small vertebrates such as frogs and fish are also included in their range of food.

Breeding

The corncrake is polygamous, i.e. the male has several females. The male attracts the female and marks its territory with its familiar high-pitched song, the *crex*. When the male has attracted the female, she remains within the immediate vicinity of the male for several days. When the eggs are being laid, the bond between the male and the female is broken. Sometimes the male remains in the same territory throughout the summer, other times he finds a new territory where he will resume his *crex* call. The *crex* call usually lasts from the middle of May until the middle of July, interrupted by periods with fewer *crex* calls, when the male and female form pairs.

Regarding the corncrake's breeding habits, the following points have been noted:

- ◆ The corncrake prefers to breed near its own species.
- ◆ The female lays 8 – 12 eggs at a time.
- ◆ Investigations from abroad have shown that the corncrake can have up to three broods per breeding season. It is unknown how many broods the Danish corncrake has, but it is thought to be 1-2 broods.
- ◆ Many broods hatch in July and the beginning of August.
- ◆ The earliest brood may be hatched at the end of June and the female of such a brood may hatch another one at the end of July or at the beginning of August.
- ◆ The female leaves the brood after only 10 – 15 days.
- ◆ In the first 2 – 3 weeks after hatching, the young are not completely mobile and take cover when disturbed. During mowing, they have very few chances of survival.
- ◆ The young are able to fly after around 6 weeks.

- ◆ Success in breeding is generally high if we disregard the death-rate precipitated by the hay harvest. Investigations have shown that 80 - 90% of eggs hatch and that the young subsequently have a survival rate of 50 - 60%.

The corncrake's survival is dependant upon producing many young as the death rate of the adult birds is relatively high - investigations in Britain have shown that around 5 fledglings per female must be produced each year to prevent a decline in the population.

2.4 Threats

Throughout this century, the number of corncrakes has markedly decreased in the whole of Europe. The cause of the great decline of this species has been very thoroughly researched, and there is every indication that the intensification of agriculture constitutes by far the greatest threat to the species. The more intensive the activity, i.e. use of machines, drainage, fertilisation and pesticides, the lower the population of corncrakes.

2.4.1 Threats to the breeding ground

It is a well-documented fact that the population of corncrakes as a breeding bird has declined in areas with fertilised hay meadows and machine-mowed hay, whereas the population has been maintained in areas where farming has remained extensive.

The mower:

The great decline of the corncrake in Denmark and the rest of Europe coincides with the introduction of the mower and the earlier harvesting time from 1910 until the 1940s.

As a rule, young birds fly away from the mower but since hay cutting takes place at a time when most of the young are still unable to fly, mowers constitute a very great threat to the corncrake's young.

The use of the mower for hay harvesting constitutes the following threats for the corncrake:

- ◆ During hay harvesting, it is not possible to see any corncrakes hidden in the high grass. This is why almost all the nests are destroyed with mechanical hay harvesting.
- ◆ The high speed of these mowers combined with the corncrake's tendency to take cover in the high vegetation when it is disturbed leads to many young being killed.
- ◆ The mower makes it possible to harvest many areas within a short space of time, which leads to a sudden and marked reduction of suitable habitats.
- ◆ Very often the hay is harvested from the edge and into the centre of the field, cutting off the corncrakes in the field from the surrounding areas and preventing them from escaping the combine harvester.

It is also very significant, with regard to the corncrake's decline, that harvesting time has been brought forward by a few weeks.

Breeding places have disappeared because of drainage and cultivation:

Another key factor in the decline of the corncrake population is the drainage of the damp hay meadows in favour of more intensive cultivation. Due to drainage, a large part of the natural habitat of this species has declined or disappeared.

Pesticides:

The use of pesticides directly reduces the amount of food accessible to the corncrake. The direct effect of this on the corncrake has not been proved, but it is almost certainly a factor that has placed restrictions on the environment that the corncrake needs in order to thrive.

Fertilisation:

Finally, the application of fertilisers is undoubtedly a factor that has handicapped the corncrake. The application of large amounts of fertilisers, combined with early and frequent hay harvests, the existence of one-crop farming of individual types of grass is a frequent consequence. Such localities will not offer the food the corncrake needs to thrive, and at the same time, the areas will very often become dense "vegetation mats" that are impracticable for the species.

2.4.2 Threats in wintering habitats etc

There are not thought to be many threats to the species in its wintering habitats in Southern Africa. In Southern Europe and North Africa, migrating corncrakes are hunted. Their being hunted is thought to be of insignificant importance for the European population of corncrakes. Other factors such as predation of eggs and collisions with objects such as electric wires are also thought to be of insignificant importance.

2.5 Corncrake-friendly farming

The corncrake is a sensitive species that does not thrive alongside efficient industrial farming. British and French investigations suggest that even a continuous decline in the population over several years can be turned around with a determined effort. Changes in the use of the grasslands in Great Britain have brought about an increase of around 23% from 1993 to 1998 and have resulted in the population of corncrakes being re-established in parts of its former area of distribution.

Flexibility is one of the key words behind the British success. Thus there are small "corncrake pens" or "corridors" set aside or fenced off within intensively cultivated agricultural areas where the corncrake is present. Other flexible arrangements where farmers are able to exchange a hay meadow with a public body each season, in instances where corncrakes are breeding in a field, may also be counted as an initiative that is of benefit to the corncrake. Table 1 gives an overview of the corncrake's basic needs with respect to agriculture in any given area.

In order to help the corncrake survive alongside everyday agricultural activity in the meadows, the following is essential:

- ◆ Harvest as late as possible, preferably after 1st August.
- ◆ Avoid the use of fertilisers and pesticides.
- ◆ Drive from one side of the field to the other or from the centre of the field and outwards, as shown in figure 1.
- ◆ Have a border of around 1-meter standing uncut into the neighbouring plot or keep some patches in the dips uncut.
- ◆ Make a note of whether you hear or see the corncrake. If you do discover a clutch of young corncrakes, change your harvesting route so that they can have time to hide.
- ◆ Harvest your meadow in stages over a relatively long period i.e. 14 days.
- ◆ Grazing of livestock in the corncrake's breeding area should only take place after the hay harvest and should not at any time exceed 0.25 young cattle per hectare

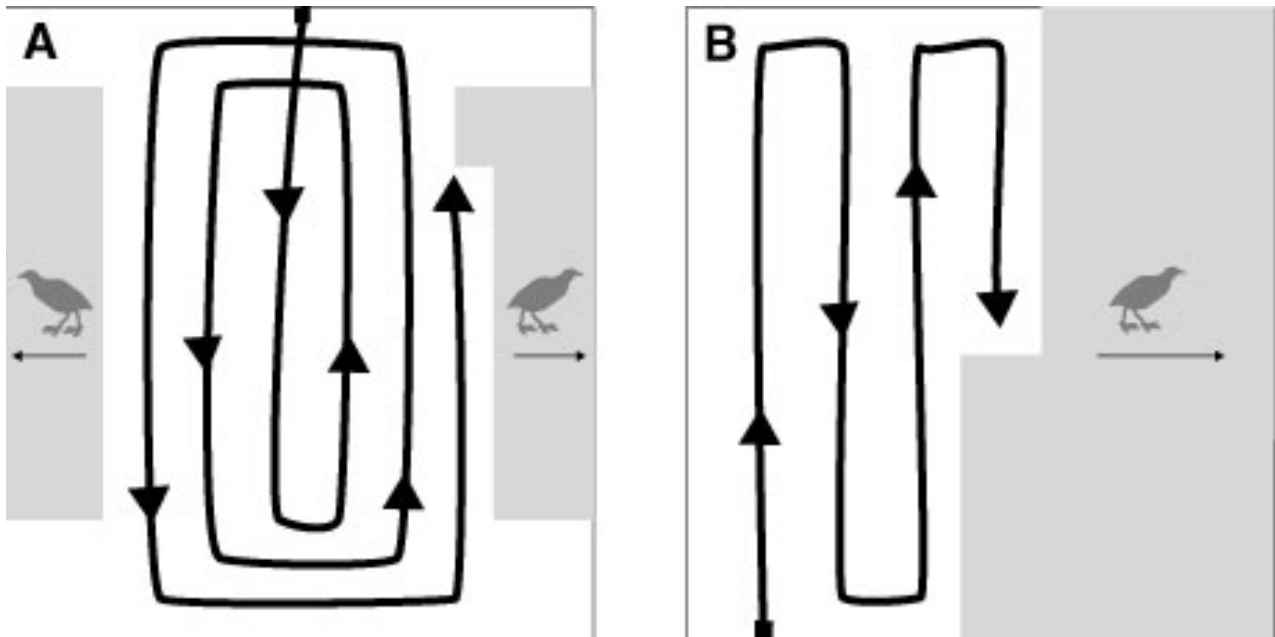


Figure 1. Harvesting methods. The corncrake lives well hidden and very seldom flies up when disturbed. The young under one month old and birds that are shedding their feathers are not very capable of flying or taking cover when they are disturbed. This is why many corncrakes die during hay cutting. Harvesting from the centre of the field and outward a), or harvesting from one side of the field to the other b), reduces the risk of unnecessarily killing a large number of corncrakes.

2.6 Latest development

About 100 years ago, there were large populations of corncrake in Western Europe, i.e. France, Great Britain, Ireland, Belgium, Holland, Germany, Denmark and Norway. But during this century, the corncrake population has markedly declined throughout the whole of Europe. During the years 1970-1990 alone, the number fell in Europe by around 50%.

More than 95% of the population of Europe's corncrakes are found today in Eastern European countries which have continental climates. In the beginning of the 1990s, the population in Russia was estimated to be 10,000 - 100,000 pairs, in Belarus 55,000 – 60,000 pairs and in Latvia the number was estimated as 26,000 – 38,000 pairs. The figures show a decrease in distribution over a 20-year period and in respect of Latvia and Russia, this is thought to be up to 50%.

In former times, the corncrake was also regularly seen in Danish agricultural areas, and until 1900 it was referred to as being a common or regular breeding bird all over the country. An actual census of the number of corncrakes was not carried out before their decline set in, but an article by Ole Thorup (1999) gives a rough estimate of the population as being around 10, 000 – 20,000 pairs in the early 1900s.

However, as early as about 1940, the corncrake was referred to as being a breeding bird that is not very numerous in most places in the country where suitable habitats and breeding places could be found. The Danish Ornithological Society has, on the basis of voluntary ornithological observations, carried out two surveys in recent times on the distribution of corncrakes in Denmark. In 1971-1974, 77 singing birds and only 9 definite breeding pairs were recorded. The actual population is estimated to have been 25 – 100 pairs. In the period 1994 – 1996, no more than 5-6 breeding pairs were recorded. Because no one knew of any regular breeding incidences around the middle of the 1990s, the species was declared disappeared on the Danish Red List in 1997.

2.7 Present situation

Since the middle of the 1990s, the number of corncrake sightings in Denmark has begun to increase again somewhat unexpectedly. During summer 1998, at least 80 individuals making the *crex* call were recorded, of which most were on Bornholm (29) and Zealand (28). In 1999, the year after, the number of corncrakes making their *crex* call exceeded 200 and in 2000, the number of corncrakes making their *crex* call was at least 250. In some of the Danish areas, corncrakes making their *crex* call have been recorded both in 1999 and 2000, and in a number of sites the birds has remained stable for such a long time that it is certain they have bred.

The explanation of the large increase in Denmark over the last few years is no doubt to be found in the knock-on effect of the marked increase in the Eastern European countries. In Poland alone, the population is said to have increased from around 7,000 males with their *crex* call a few years ago to 34,000 – 53,300 in 1999 and in the European part of Russia, it is estimated that the corncrake population is up to about 1.5 million.

The cause of this increase in Eastern Europe is no doubt due to large areas previously used for collective farming being allowed to lie uncultivated since the fall of communism. The large new grass meadows now make up the ideal biotope for the corncrake. However, when agriculture becomes more efficient again in Eastern Europe, or when the present corncrake areas become overgrown, we can expect the population to fall again.

2.8 Description of corncrake areas

If we disregard recent incidents of people hearing the corncrakes making their *crex* call in Denmark, we can say that since the 1960s, people are only certain about regular populations in 3 areas in the country: Meadows around the Skjern River, Varde River and Ry River in Store Vildmose. The corncrake disappeared from the Skjern River meadows after draining had taken place in 1968 and from Varde River Valley in 1973. If we disregard the recent occurrences of corncrake activity over the last few years, we can say that in Store Vildmose, the last time corncrakes were recorded was in 1983. We can assume that the corncrake's three old areas are favourable to the bird as long as farming methods used are corncrake-friendly. It is for this reason that these three areas must be high priority in the attempt to have the corncrake back as a Danish breeding bird.

Besides focusing on the "old" areas, it will also be appropriate to channel some of our efforts on to the areas where the corncrake has been recorded in recent years and the areas where the species thrive.

It remains to be seen whether the corncrake thrives in an area where it has been recorded and whether it can be expected to breed in that locality in the future. In this action plan, the following criteria are used to judge whether the areas can be called "corncrake areas":

- ◆ In these areas, there have to have been corncrakes making their *crex* call both in 1999 and 2000.
- ◆ In these areas, the corncrakes making their *crex* calls have to be registered early in the breeding season, i.e. before 1st June.
- ◆ The corncrake(s) making *crex* calls have to have been reasonably stable in the course of the period of at least 14 days over the summer.
- ◆ The areas must contain flora and fauna suitable for the breeding corncrake.

A total of 7 Danish areas fulfil the above mentioned criteria:

- 1) Ry River Meadows, North Jutland County
- 2) Gårdbo Lake and Sørig Meadows, North Jutland County.
- 3) Bolle and Try Meadows, North Jutland County
- 4) Sliv Lake, Southern Jutland County
- 5) Brabrand Lake, Århus County
- 6) Tryggevælde River Valley, Roskilde County
- 7) Holmegårds Mose/ Porsmose, Storstrøms-/ West Zealand County

2.8.1 Areas of interest with sightings of corncrake over the last few years

1) St. Vildmose, Ry River Meadows, North Jutland County

Ry River Meadows in North Jutland County is the only one of the three previously mentioned "old" corncrake areas where the species has been recorded in recent times. Since 1997, between 2 and 7 birds making their *crex* calls have been recorded every year, and in those areas the earliest *crex* sound was recorded on the 15th May.

The corncrake areas near Ry River can be divided into two sub-areas. One of about 250 hectares in Gl. Toftegårds Meadows in Åbybro Borough and one of about 850 hectares near Stavad Meadows in Brønderslev Borough.

Stavad Meadows has been designated as a Special Area for Protection according to the EU's Habitats Directive together with the marshland at the edge of Store Vildmose. A large part of the land is owned by the Birkelse Estate, this includes the central areas in Stavad Meadows that are rented out for hay production. This industry has a long history in the area. These areas are under a conservation order.

The proposal for preservation includes around 200 hectares of meadow, and it is expected that a number of operational conditions will be included in the preservation order that will ensure and encourage the corncrake and particular flora in the area. The major part of the land must not be re-allocated, planted up, fertilised, or sprayed with pesticides. Ditches must not be cut (though efforts to remove trees and bushes may be permitted), parts of the land may only be used for cutting hay - not for grazing, parts of the land may be cut on 15th July at the earliest. Finally, hay may only be harvested in parallel strips from one side of the plot towards the other. The County Council has the option of renting out up to 15 % of the land. The County Council hopes that it will be able to exchange land within 250 meters of the singing post with the rented land, if the corncrake does not settle in the rented fens.

2) Sørig Meadows, North Jutland County

Sørig Meadows in North Jutland County is a former lake, which has now been drained and partly cultivated. In this area, there is quite a bit of hay harvesting, presumably because there are quite a number of horses in the area. This is not a protected area or designated as part of an international nature preservation area.

Apparently, the area has been established in the past few years as a suitable locality for encouraging an increase in the number of corncrakes. Around 30 birds making their *crex* calls were registered in 2000 and 2-3 in 1999. In 1998, 5 birds were heard. Only in 1998, a male making the *crex* call was heard earlier than 1st June. When this locality is mentioned in this plan, it is because several adult corncrakes with young have been sighted several times in this area, which is definite proof that the species has bred in this area.

3) Bolle and Try Meadows, North Jutland County

Bolle and Try Meadows in North Jutland County is made up of a patchwork pattern of arable land which is, in Danish terms, deserted and a large uninhabited area. In the area, there is arable land, fallow fields, meadows, tiny bogs, individual planted groves and large willow shrubs in old overgrown meadows where grazing has been abandoned. Generally speaking, the area is becoming rapidly overgrown, and some of the land has been taken out of service altogether. Most of the land that is not overgrown is cultivated.

This area is not included in any preservation scheme neither has it become part of an international conservation area.

Since 1993, it has been estimated that the corncrake has been a possible breeding bird in the area. Both in 1999 and 2000, about six birds have been heard making their *crex* calls. In both years, the first bird was heard in the month of May.

As of 1st September 2000, North Jutland County has five voluntary agricultural agreements in a total of 12 hectares that are primarily grazing agreements. North Jutland County estimates that at present it will be difficult to make agreements on operational corncrake-friendly use. As the area is being overgrown rapidly, the alternative will no doubt be for the corncrake to disappear from that area within the foreseeable future.

4) Sliv Lake, Southern Jutland County

Sliv Lake, situated in Southern Jutland County, directly east of the town of Hoptrup, was a creek at the bottom of Diernæs Bay about 6,000 years ago. Silting-up caused the area to change into a typical fresh water lagoon. Immediately before drainage took place in the 1950s, Sliv Lake appeared as a wetland of about 300 hectares, including 150 hectares open expanse of water with an average depth of 1 meter.

Since pumping stations and installations of drainage canals have been built, large parts of the area have been cultivated intensively. In 1997, approximately 60% of the agricultural land was used for grain cultivation, 5% for coarse fodder, 22% for grass/grazing and 12% fallow. Smaller parts of the area are designated for other purposes, i.e. summer houses, while allowing small parts of it to remain in its natural state.

For the sake of nature and the environment, the Southern Jutland County Council has decided to recreate Sliv Lake, to make it more similar to how it was before the introduction of regulations and drainage – this will probably be in 2002-2003. When plans have been made for this new lake along with its wetlands and meadows, they will take into account its unique natural features, one of which is the corncrake.

The Danish Ornithological Society carried out ornithological monitoring for the County in 1999-2000, which has shown that there were corncrakes making their *crex* call in some of the meadows and fallow fields of the area. Recordings made by the Danish Ornithological Society indicate that the number of breeding pairs in 1999 was 6, and the number of breeding pairs in 2000 was two. This has led to the decision to flood the western part of the drained area while allowing the eastern part, where the corncrake is prevalent, to remain in its present state. The more intensively cultivated areas are expected to be converted to a patchwork of water-covered areas, wet and dry meadows and grazing areas. In the areas bordering the actual lake, there will be open lowland areas abundant in grass and with few bushes. In connection with the Sliv Lake Nature Project, it will also be possible to reach agreements on corncrake-friendly methods of farming. An additional approach would be to enlarge the area with possible subsidies for corncrake-friendly methods of working of the surrounding fields where agricultural production remains unchanged by the implementation of the

project. Some of the land is owned by the County and may be included immediately into a plan of action for the corncrake.

5) Brabrand Lake, Århus County

Brabrand Lake lies immediately west of Århus. This lake is 150 hectares and surrounded by 55 hectares of reed swamp with willow and alder and by around 60 hectares of fresh grassland which is extensively grazed and which is in the process of being overgrown. The land around Brabrand Lake and the river valley west of the lake are protected areas.

In the past, the water in Brabrand Lake was clear and had an abundance of floor vegetation. However, the increasing application of phosphorous into the lake has resulted in it becoming turbid with an increased production of algae during the 1950s and 1960s. The introduction of phosphorous to the lake has since then been scaled down and a lake restoration project has been implemented.

For five years running, people have registered between 1 and 4 corncrakes making their *crex* sound in the areas surrounding Brabrand Lake. Apart from in 1999, when the first bird was recorded on 2nd June, corncrakes have been recorded in the locality during the month of May. For this reason, it is possible to say that the meadows surrounding Brabrand lake are presently areas where the bird has been registered most often during the breeding seasons.

Brabrand Lake and its adjoining areas are today important for their natural beauty, and because of their location close to Århus, they are of great recreational value. The meadows around the lake are resting-places and breeding places for several different species of birds. The District Council is working with Århus borough on a project to re-create Årslev Meadow Lake. The plan is that an area of approximately 70 hectares around this new lake will consist of new grassland and be extensively farmed. The area will come to consist of a mosaic pattern of different natural features such as canebroke, uncultivated meadow areas and extensively cultivated patches of land that are either grazed or mechanically cut.

In connection with the project and modified conservation regulations for the area, Århus County Council will draw up a management plan for the area. Naturally, "corncrake-friendly" management will be included in this plan.

6) Tryggevælde River Valley, Roskilde County

Tryggevælde River Valley in the southern part of Roskilde County with over 350 hectares of adjoining wetlands makes up the biggest meadow and fen area in Roskilde County. The valley is divided into over 100 independent meadows. Practically all the area was grazed until the 1960s, after which grazing gradually ceased in many of the meadows. Since 1990, the development has reversed due to subsidy schemes for fencing and grazing, so that there is now grazing or hay harvesting on over half of the river valley area.

Today, Tryggevælde Valley stands out as a patchwork pattern of grazed and ungrazed meadows with small patches of reed swamps, hay crop meadows, willow shrubs and small planted groves. In many of the meadows further away from the river, it is possible to find unique and luxuriant marshland rich in plant-life, whereas the areas nearer to the river are dominated by manna grass. The greater part of these meadows is covered by water in periods during the winter months.

Up until now, management work in this area has concentrated on preserving and improving the environment both for wading birds such as lapwings and redshanks, and the unique abundance of plant life in the marshland. Here there are several species of plants included in the red list, for instance musk orchis, and large populations of other species of orchids.

Tryggevælde Valley is home to one of Denmark's most stable populations of corncrakes in recent times, since corncrakes making their *crex* sound have been heard in the last 4 years, c.f. table 2. In the river valley, thriving breeding populations of meadow birds are found (1999 figures in parenthesis): Lapwing (45), redshank (11), common snipe (15) and yellow wagtail (26). The valley contains Zealand's largest colony of sedge warblers (42 singing males in 1999), and most years 1-3 pairs of marsh harriers breed.

Table 2. The number of recorded corncrakes making their *crex* sound in Tryggevælde valley in recent times (source: Danish Ornithological Society).

<i>Year</i>	<i>Number of corncrakes recorded making their crex sounds</i>	<i>Date of first recording</i>
2000	3	13 th May
1999	4	16 th June
1998	7	10 th May
1997	2	23 rd May

Tryggevælde Valley is not a conservation area, but 347 hectares of the valley's low-level area has been designated as a Special Area for Protection according to the EU's Habitats Directive. Its designation is due to its calcareous bogs and meadows with purple moor grass on calcareous, peaty earth and the presence of fen orchis.

Monitoring of the breeding birds took place in Tryggevælde Valley in 1981-82 and also on a yearly basis from 1986.

Monitoring is based upon 5-7 day-time visits and one night-time visit. Thorough botanical investigations of the whole valley were carried out in 1980 and 1991, while the development of the outstandingly beautiful orchid meadow has taken place on a yearly basis since 1986.

Since 1990, Roskilde County has entered into agreements on grazing with several owners of meadows. Clearing of willow shrubs and alder thicket has also been done in some meadows and several poplars have been pollarded along the edge of the river valley. This work is expected to continue since these endeavours are hoped to cater for any corncrake activity in the area in connection with the grazing agreements.

With regard to the typical meadow birds and plant-life, attempts will be made to maintain as much grazing as the different subsidy schemes allow (up to 1.4 large animals per hectare). On the occasions when the corncrake is present, the high level of grazing can in some cases be adjusted by agreement with the farmer, because the greater part of the meadows are grazed by only two farmers who are able to move the animals round between a great number of folds. As several corncrakes making their *crex* sound appeared to have settled in a meadow near Kirkestien at Strøby in 1998, grazing of that particular meadow was postponed from the middle of June until the end of July.

7) Holmegårds Mose/Porsmosen, Storstrøm County

Parts of the protected areas, Holmegårds Mose and Porsmose, in immediate proximity to one another, are located in Storstrøm County. Previously, the area made up part of the very large raised bog-, marsh and meadow areas, which River Suså runs through and drains. Later on, parts of the area were drained and cultivated or used for peat-digging.

Today, Porsmosen is made up of 400-500 hectares of meadow and it is thereby the County's largest area with fresh meadow. The greater part of the meadows in Porsmosen are grazed (extensively) by cattle, but in this area there are also large spaces, where farming has been abandoned for many years. These areas now lie fallow with grass or weeds of varying heights.

Part of Porsmosen has been home to the corncrake for at least three years (1997-99) in an area north-east of Rødebro. In 1999, 8 territorial males were recorded; the birds were heard in the period

from 23rd May until 31st July. The corncrake has been recorded almost exclusively in the areas that have not been grazed. Most of the places were covered with water in early spring.

Both Holmegård Mose and Porsmosen are designated as Special Protection Areas according to the EU's Bird's Directive.

The bird life along the River Suså in Storstrøm County is currently monitored by the County Council. During the year 2000, more thorough investigations of habitats in the corncrake locality have been carried out. On the basis of these investigations, the County Council plans to do everything within its powers to enter into voluntary agreements with the plot owners involved, so that implementation of the agreements may be started in 2001.

Porsmosen adjoins Gødstrup Enghave naturally, where the County is working on implementing a restoration project. Even if corncrakes are not recorded in Gødstrup Enghave, Storstrøm County Council will try to obtain voluntary agreements with the plot owners involved.

2.8.2. Other areas of interest

1) Varde River Valley, Ribe County and the meadows near Ho Bay have been designated as a Ramsar area, Special Protection Area for EU birds and Special Area for Conservation of EU habitats. It is also specified in Ribe County's regional plan as a special conservation area with a coastline of outstanding beauty as well as an area of cultural and historic interest. The most extensive salt meadows and meadow areas in Ribe County are to be found here. This area is also one of outstanding beauty and abundant in different types of flora and fauna.

However, most of the meadows in the area over the last decades (since the beginning of the 1970s) have been used by farmers for the intensive production of nutritious grass, which is not in keeping with its status as an important area for wildlife. This discrepancy between farming and nature, and environmental interests has meant that recently attention has been turned to concerted efforts to look after the natural environment, and Varde Valley and the meadows near Ho Bay have been the object of a larger nature restoration project.

Together with agricultural organisations, plots owners and a number of official bodies, steps were taken in 1996 to start an agricultural and farming project with the name "Operation corncrake". The project includes around 2,700 hectares of low-level land and aims to improve the natural and environmental conditions in the meadows near Varde River and Ho Bay whilst farming is maintained. It is planned to be implemented by offering plot owners 20-year operational agreements on extensification of farming and changes in the drainage systems in the areas.

The overall objective of "Operation corncrake" is to: safeguard the area as a dynamic part of the Wadden Sea with its characteristic flora and fauna, including the unique bird life and reduce the loss of nutrients to the aquatic environment. The objectives are to be honoured by offering farming agreements to plot owners, which will make it possible for farming to become more extensive or to remain extensive. The level of drainage will also be reduced because the project areas will tolerate a higher ground-water table, especially in the winter and spring months.

It is hoped that land-owners will enter into agreements on environment-friendly hay harvesting, grazing and drainage for a maximum of 2,200 hectares of coastal meadows and pastures up until 2004. The remaining 500 hectares will probably have conservation agreements or remain unused with reed forests, water holes, small lakes etc.

Biological and agronomical parameters relevant to the project are monitored to examine administrative initiatives taken to improve possibilities of the corncrake returning to the area.

With "Operation corncrake", plans are to be drawn up for the management of parts of this comprehensive project area, such as information material for plot owners on corncrake-friendly farming. The latter will be carried out on the basis of a particular plan of action for the corncrake in Varde Valley, which Ribe County Council is in the process of drawing up.

Varde Valley was one of the last places in Denmark to be home to permanent breeding of corncrakes and the species was recorded there until the beginning of the 1970s, when the agricultural industry began to change. Hyllerslev Meadows and areas closest to Varde River in Billum Meadows and the westernmost corner of Janderup Meadows are known breeding areas from that period. The corncrake was also recorded in Varde Kær, east of the present ring road, now a closely built-up area extending right up to the river valley. It is also possible that the bird has been registered in other parts of Varde Kær, Øve Meadows and the Toftnæs area.

Today, the former breeding areas are also estimated to be sub-areas within the actual project area, where the bird's return is most likely. In these particular sub-areas, it is also important to do one's utmost to recreate the original, damp and extensively used meadows that the corncrake depends on for survival. The possibility for this exists. However, with regard to general requirements and aims for work to be carried out in areas that come under "Operation corncrake", sub-projects will be introduced to make the area suitable for the corncrake to breed. In order to encourage the re-creation of the corncrake biological environment in its previous breeding areas, it may be a good idea to avoid harvesting at certain times over a 2-3 year period, after which corncrake-friendly hay making can be implemented. In the long term, we must look into the possibility of making agreements with farmers in the important corncrake areas. We could also consider the possibility of establishing a pool of "reserve meadows", which plot-owners could have at their disposal when the presence of the corncrake prevents their usual projected activity.

2) Skjern River, Ringkøbing County

Up until the end of the 1960s, the meadows in the lower part of the Skjern River were home to regular breeding corncrakes. The last known observation of a bird making its *crex* call comes from the area north of Lønborg. The corncrake disappeared when the main part of the drainage had been completed in 1968.

A nature restoration project to restore the course of the river was implemented in 1999. The purpose of the project is also to restore a large comprehensive natural area with patchwork patterns of common land, wet meadows, reed marshes and ponds as well as to improve the living conditions of wild plants and animals. The project area includes the lowest 2,200 hectares of the river valley before it runs into Ringkøbing Fjord, corresponding to a stretch of 20 km. The meadow areas will be about 1,500 hectares, corresponding to about 2/3 of the area.

The regulatory framework for the project is expected to be that the area shall be used for grazing, mowing or reed cutting. Use of fertilisers, pesticides and changing the grass areas within the project area will be forbidden.

It is expected that approximately 2,050 hectares of the project area will be managed by the National Forest and Nature Agency whilst the remaining 150 hectares will be owned by private or other public authorities.

With the state-owned areas, a special plan for work and conservation will be drawn up after the project has been carried into effect in the year 2002. Concurrently with its actualisation, conserva-

tion will be started, primarily in the form of grazing in order to avoid any overgrowing. In the first phase, which includes the area west of arterial road A11 (approximately 1400 hectares), some grazing will be implemented from and including the year 2001.

With the privately owned areas, the statutory demands on care and cultivation restrictions are outlined in a recorded declaration, cf. above. There are no demands for intensity or form of management.

There will be suitable areas for the corncrake's habitat in approximately 1,500 hectares of meadow, of which the greater part will be state owned and have varying degrees of management and combinations of grazing/mowing.

3.0 Suggestions for future management

The corncrake is mentioned as disappeared on the Danish red list of plants and animals (1997). This is because the Danish breeding population has gradually become so small that there were no regular instances of corncrakes breeding in Denmark.

Due to the temporary corncrake-friendly situation in Eastern Europe, there has been a noticeable increase in the number of corncrakes making their *crex* calls in Denmark. Because of this situation, Denmark has a historic chance of having the corncrake back as a regular breeding bird. There is every possible reason to concentrate our efforts on this species that is threatened on a world-wide scale.

3.1. International objectives

In 1996, BirdLife International drew up an international action plan for the management of threatened species of birds in Europe, including the corncrake. The action plan has been compiled with the help of the EU's LIFE-program and is made in collaboration with the EU, the Standing Committee in the Bern Convention and Wetlands International.

The overall aim of the plan of action is:

- ◆ Draw up international guidelines for extensive farming in hay meadows.
- ◆ Promote national and regional guidelines in the interests of the corncrake, including national action plans.
- ◆ Ensure maximum protection of corncrake localities in compliance with national statutes.
- ◆ Develop a European monitoring strategy.
- ◆ Prevent the population of corncrakes from falling under the 1994 level in respect of population size and distribution in Europe. If this is done, the species can be removed from BirdLife International's global list of threatened bird species.
- ◆ Ensure that small breeding populations which are at risk from disappearing are saved.

The recommendations of this plan of action should be achieved by:

- ◆ *Preservation or increase of the areas that are used as habitats for the corncrake.* Natural habitats that require a minimum of human interference and that are most suited to the corncrake have highest priority. The aim is that corncrake habitats retain suitable vegetation structure (avoidance of tangled grass). The aim is that change in crop rotation, intensification and the withdrawal of farming in the natural habitat area is prevented.
- ◆ *The corncrake habitats are run in a corncrake-friendly way.* This is done either by retaining traditional, non-mechanised methods or by modifying mechanised methods (this applies mainly to Western Europe). The aim is to reduce the use of agrochemicals (pesticides, fertilisers). The aim is to: 1) grow grass that is harvested late, 2) try to prevent the use of fast machinery, for example circular mowing, 3) encourage corncrake-friendly mowing, postpone it until after the young are ready to fly, mow in smaller areas over a longer period, mow from the middle towards the edge or in strips, 4) Care or development of high ground vegetation throughout the whole season in the adjacent hay meadows

In connection with a seminar, Strasbourg 1995, where the international action plan was introduced, specific recommendations for individual European countries were given. Denmark was recommended to:

- ◆ Draw up a national plan of action for the corncrake
- ◆ Ensure that the corncrake-friendly action plan introduced into the Ry River/Store Vildmose area is continued, evaluated and if necessary improved

- ◆ Try to promote corncrake-friendly farming in former corncrake localities and conservation areas besides Ry River/Store Vildmose, postpone mowing until after 1st August or 16th July at the earliest and mow from inside and outwards or in parallel strips.
- ◆ Make sure that the welfare of the corncrake is catered for in all valleys included in the especially sensitive agricultural areas (possibilities of subsidy under agri-environmental measures), and in other schemes where there is state subsidy.
- ◆ Ensure close contact between the Ministry of Environment and Energy, the Ministry of Food, Agriculture and Fisheries, the County Councils and the Danish Ornithological Society, in such a way as to facilitate the exchange of information on preferred habitats, stipulations and other information.
- ◆ Attempt to direct drainage programmes, where it is feasible, for example in connection with the restoration of Skjern River, and draw up specific guidelines for corncrake-friendly farming.
- ◆ Carry out national corncrake monitoring activities as part of the Danish Ornithological Society's Atlas- and bird locality project 1993 – 1996.
- ◆ Draw up guidelines of corncrake-friendly management for farmers.
- ◆ Try to prevent further drainage of corncrake habitats.
- ◆ Investigate the importance of leaving fields permanently fallow and encourage ecological farming in relation to the possible return of the corncrake.

3.2 Objectives in Denmark

The objective of this management plan is generally to create localities where the corncrake can once more settle with a regular breeding population. The international objectives are used for inspiration which are already drawn up by BirdLife International, as well as the recommendations that Denmark has received in connection with this.

These specific objectives are carried out

- ◆ To create a good breeding environment and maintain the corncrake populations in the seven areas where the corncrake has settled permanently. This includes the area around Ry River Meadows.
- ◆ To re-establish permanent breeding populations in the two former good breeding areas for the corncrake in Varde Valley and Skjern Valley.
- ◆ To accommodate the corncrake in these areas together with local agricultural societies by implementing corncrake-friendly methods of farming as far as is practically possible (see table and figure 1).
- ◆ To start a monitoring programme of the corncrake.
- ◆ To locate potential new breeding areas in Denmark, as far as practically possible.
- ◆ To do all that is possible in the new breeding areas in Denmark.
- ◆ As far as is practically possible, incorporate the corncrake into future nature projects.
- ◆ As far as is practically possible, to include other sectors, such as farmers' associations into the work done for the corncrake.

3.3 Action plan for implementation

The above objectives should be achieved by the following:

- ◆ In the following prioritised Danish localities where there are corncrakes, the County Councils try (continuously) to enter into agreements on corncrake-friendly farming: Ry River Meadows, Gårdbø Lake/ Sørig Meadows, Bolle/Try Meadows, Sliv Lake, Årslev Engsø (Brabrand Lake), Tryggevælde Valley, Porsmosen. In the sub-areas with particularly favourable conditions for the

corncrake, corncrake-friendly plans need to be drawn up. The areas not designated as especially sensitive agricultural areas ought to be designated at the first opportunity.

- ◆ Consideration made in the preservation proposal for Ry River in connection with the administrative authority's special privilege of renting and leasing up to 15% of the area (c.f. Ch. 2.8.1) is used as a pioneer example and inspiration in other areas where there are signs that the corncrake has started to breed.
- ◆ Monitoring of prioritised areas ought to be carried out by the administrative authorities with a view to adjusting the way the land is used when corncrakes are present. At a minimum, monitoring ought to include a night-time count at the end of May and the beginning of June, and areas where the bird is present should be plotted.
- ◆ *Monitoring in the rest of the country:* It will only be possible to collect data on the different areas where the bird is found with the help of volunteers. Until 2003, the Danish Ornithological Society is co-ordinating and compiling records of rare Danish breeding birds from amateur ornithologists. After this The National Forest and Nature Agency and The National Environment Research Institute will try to compile more permanent data.
- ◆ *Skjern River:* National Forest and Nature Agency are drawing up a management plan instigated by the preservation proposal that was drawn up for Ry River. It guarantees that out of the 1500 hectares of meadow area, there will be at least two large adjoining areas, run in corncrake-friendly ways, cf. Ch. 2.5. Evaluations suggest that grazing should be altered at suitable intervals.
- ◆ *Varde River:* Elements in the preservation proposal for Ry River should be incorporated into the philosophy of the restoration and future farming and management of the area. The undermentioned points regarding information and communication are strongly emphasised in this project. Corncrake-friendly agreements should be compiled for the sub-areas that are suitable for the corncrake in accordance with the plan of action for the corncrake in Varde River Valley that Ribe County Council is in the process of drawing up.
- ◆ *Corncrake-working group:* A working group is being set up that will follow and continuously evaluate the initiatives that the plan entails in the next five years. The structure of the working group is such that the National Forest and Nature Agency, the National Environment Research Institute, The Agricultural Council, the Danish Ornithological Society and the relevant County Councils are represented. It may also be a good idea to draw in individuals who can contribute their knowledge of the corncrake.
- ◆ *Publication of the action plan:* The action plan for the corncrake is published in a limited number of editions and is also available on the National Forest and Nature Agency's home page on the internet. The plan is translated into English and is presented in international fora as Denmark's contribution to the international recommendations and obligations in the EU's bird directive and in the Bonn and Bern conventions.
- ◆ *Other communication:* Besides the action plan, the National Forest and Nature Agency is producing a small folder on corncrake-friendly farming methods. The purpose of this folder is that it can be sent to farmers in areas where people have sighted corncrakes when monitoring the area. The National Forest and Nature Agency writes popular articles that are published in the relevant journals, and particularly agricultural journals.
- ◆ *Meetings with regional agricultural consultants:* The National Forest and Nature Agency together with the County Councils communicate with agricultural consultants in areas where the corncrake is given priority.

3.4 Methods

One method of protecting the corncrake is information. Plot owners who have corncrakes in one of their meadows should be made familiar with corncrake-friendly harvesting times and mowing.

Subsidy schemes (agri-environmental measures etc.) and funds of nature management, possibly supplemented with EU's LIFE funds, can form the economic basis for the actual management of an area that has corncrakes.

A working group is set up to continuously follow and assess these initiatives that the action plan entails.

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