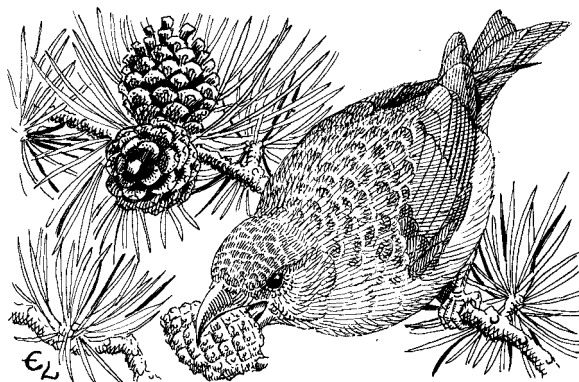


**Species Action Plan
for the
Scottish Crossbill *Loxia scotica*
In Europe**



Final draft, December 1999

**Prepared by BirdLife International on behalf of the
European Commission**

Species Action Plan for Scottish Crossbill *Loxia scotica* in Europe

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Timetable

Date of first draft: 30th April 1999

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NB: A UK species action plan already exists for the Scottish Crossbill in the UK Biodiversity Action Plan. This document aims to put this information into a European framework.

Reviews

This action plan should be reviewed and updated every four years. An emergency review will be undertaken if sudden major environmental changes, liable to affect the population, occur within the species' range. Should research suggest that Scottish Crossbill is not of specific status, an immediate review meeting should be held.

Geographical scope

This action plan needs active implementation in the United Kingdom.

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Summary

The Scottish Crossbill *Loxia scotica* is the UK's only endemic bird species. The Scottish Crossbill was given specific status in 1980 (BOURC 1980). However, the specific status of this bird is unclear due to taxonomic confusion and difficulty in distinguishing between this species and the Common *L. curvirostra* and Parrot Crossbills *L. pytyopsittacus* (HMSO 1995).

The Scottish Crossbill is believed to be resident in the central and eastern Highlands of Scotland, and mostly confined to Caledonian pine forest and old pine plantations. Little is known of recent trends in Scottish Crossbill numbers. Over recent centuries, however, it is likely that its range and numbers have contracted with the long-term reduction in the area of Caledonian pine forest. It is 'SPEC 1' (status insufficiently known) and is priority listed in the UK Biodiversity Action Plan, with a published Species Action Plan (*Biodiversity: The UK Steering Group Report - volume 2: Action Plans*). It is 'red-listed' in *Birds of Conservation Concern in the UK* (Gibbons *et al* 1996) and also fulfils 'amber-list' criteria as it breeds in internationally-important numbers in the UK (100%), and is a localised breeding species confined to a vulnerable habitat. It is protected under Schedule 1 of the Wildlife and Countryside Act 1981; Annex 1 of the EC Birds Directive; Appendix II of the Berne Convention.

Threats and limiting factors

- Reduction in habitat quantity - low
- Reduction in habitat quality - unknown, probably high
- Hybridisation and competition - unknown
- Predation - unknown, probably low

Conservation priorities

- Until the taxonomic status of the Scottish Crossbill is resolved, it should continue to be regarded as a full species.
- Thus, high priority should be afforded to conservation action to increase the population size and range of Scottish Crossbills, to be delivered mainly through generic action contained within the UK Biodiversity Action Plan's Native Pine Woodlands Costed Habitat Action Plan.

Introduction

Scottish, Parrot and Common Crossbills are not easy to distinguish in the field and, since Scottish Crossbills are intermediate in size, there has been speculation for some years as to whether they are a true species, a subspecies of one of the others which is changing (because of geographical isolation) towards being a full species, or perhaps even a hybrid between Common and Parrot Crossbill. The resolution of this conundrum has implications for the priority which will be attached to the conservation of this species and its habitat. For example, the current uncertainty concerning the status of the Scottish Crossbill hampers our ability to argue strongly that the maintenance and increase in native Caledonian pinewood is a global priority.

Background Information

Distribution and population

As already explained, the taxonomy of crossbills in the UK is extremely complex, and so it is impossible at present to give firm details of the distribution and population of the Scottish Crossbill. The taxonomy of crossbills is the subject of a current study, led by the RSPB. Although it is too early to reach firm conclusions, the results so far, based on analysis of calls, morphology, habitat preferences and a limited sample of DNA analyses, indicate the following:

- 1 There are two types of large-billed crossbills in the Scottish Highlands (provisionally classed as 'Scottish' and 'Parrot' Crossbills). There may be as many as several tens of the latter nesting in Abernethy Forest and associated areas.
- 2 These two types can tentatively be distinguished by their flight calls, though there is some overlap.
- 3 These two forms occur sympatrically (ie breed in the same localities) and with common crossbills.
- 4 Common Crossbills overlap with Scottish Crossbills, and Scottish overlap with Parrot Crossbills in morphology, distribution and habitat choice to varying degrees.
- 5 There may be two types of 'Common' Crossbills, or possibly even three.
- 6 There are no significant differences in sections of neutral DNA between the three species of crossbill.

Scottish and Common Crossbills were not recognised as separate forms until 1904 (Holloway 1996), but it seems likely that a large-billed, geographically isolated and largely resident form of crossbill has long existed in the Caledonian pine forest. This has presumably remained distinct despite periodic irruptions of Common and (less frequently) Parrot Crossbills, though this is speculation.

Common Crossbills are found in coniferous forests throughout the Northern Hemisphere, and are strongly irruptive in response to failures of cone crops. In the UK, they are mainly found in plantations of Pine *Pinus* spp, Larch *Larix* spp and Spruce *Picea* spp, with a preference for seeds of Spruce, and the population is regularly augmented by irrupting flocks from elsewhere in Europe. There is speculation that the different forms of Common Crossbill originate from different areas of Europe. The Common Crossbill is not a 'Species

of European Conservation Concern', so it is not considered to be a species of high conservation priority in Europe.

Parrot Crossbills are more northerly in distribution, and almost all breed in Fennoscandia and Russia, where populations may be fluctuating but are not known to be declining. They have a preference for the seeds of *Pinus* spp, and are also irruptive, with small numbers reaching the UK in some years. Work in the last three years at Abernethy Forest has demonstrated that the majority of crossbills breeding in the forest are Parrot Crossbills. This contrasts with museum specimens taken from Strathspey earlier this century, which fall within the Scottish Crossbill's morphological size range. It could be that Parrot Crossbills have been breeding undetected there for a number of years. The parrot crossbill is listed as a 'SPEC 4', ie it has a favourable conservation status but with populations concentrated in Europe. It is also 'amber-listed' in the UK as a rare breeder.

Scottish Crossbills:

Much work remains to be done before firm conclusions about the status of the Scottish Crossbill can be reached. In the meantime, for the purposes of this plan it is regarded as a full species and the text of the plan contains previously-published material on the Scottish Crossbill.

The Scottish Crossbill appears to be confined to the central and eastern Scottish Highlands; only sporadic movements have been recorded south to Fife and Dumfries & Galloway (Batten *et al* 1990), and these must be questioned given the difficulty of field identification. Since it is very difficult to separate this bird in the field from the closely related Common Crossbill (with which it was until very recently regarded as conspecific)(Voous 1978) and Parrot Crossbill, and because it is liable to annual fluctuations and distributional shifts or irruptions due to availability of local food supplies (Newton 1972, Nethersole-Thompson 1975), population figures have been unobtainable. This dispersive behaviour may result in the species being common in an area in one year and almost absent in another.

The population was estimated at around 1,500 individual adults in the early 1970s (Nethersole-Thompson 1975), but interpretation of the 'Atlas' data of 1968-72 (when breeding of crossbills was confirmed in over 60 squares in this species' range and considered possible or probable in over 40 others) suggests that this number is too low and that there are 1,000-1,250 pairs (Batten *et al* 1990). The New Breeding Bird Atlas did not feel able to distinguish between Scottish and Common Crossbills for the purposes of its survey (Gibbons *et al* 1993), but quoted the figure of 1500 individuals given in the Winter Atlas (Lack 1986), which was itself probably taken from Nethersole-Thompson (1975). Recent work suggests that Parrot Crossbills are present in the Highlands in considerable numbers (R Summers *pers. comm.*), complicating the overall picture still further. The Scottish crossbill has not been recorded outside the UK.

Life history

This account is based on studies of 'large-billed crossbills' in Scotland and is under review.

Breeding

Scottish Crossbills nest solitarily or socially, nests usually being built at a height of 8-20 metres near the end of a side-branch or at the top of a Scots pine (or less typically other

conifers), but sometimes close to the trunk. The eggs are mainly laid in March-May, sometimes from mid-February, the young mostly fledging before the end of June. The clutch is normally 3-4 (occasionally 2-5), there is usually only one brood per season.

Feeding

They feed very largely on the seeds of Scots Pine *Pinus sylvestris*, which are extracted with the tongue after splitting and prising the cone scales with their specially adapted bills. They also take seeds of Sitka Spruce *Picea sitchensis*, Larch *Larix* spp and Rowan *Sorbus aucuparia*, as well as buds, catkins and insects (Nethersole-Thompson 1975). They are liable to annual fluctuations and distributional shifts or irruptions due to availability of local food supplies.

Habitat requirements

Scottish crossbills are believed to be largely restricted to the Caledonian pine forests and old Scots Pine plantations of the Scottish Highlands (Knox, in Gibbons *et al* 1993). They nest mainly in old pine forest, including areas of bog pines, but also locally in Larches and other predominantly coniferous woodland. Scottish Crossbills do not usually nest in dense plantations.

Threats and Limiting Factors

This account is based on studies of 'large-billed crossbills' in Scotland and is under review.

Reduction in habitat quantity

Scottish Crossbills are believed to exhibit a high dependence on Caledonian pine forests and old Scots pine plantations, especially within the breeding season. Pine-Birch forest dominated by Scots Pine declined from more than 1.5 million hectares after the last Ice Age to 12,500 hectares in 1987, less than 1% of the original resource, of which more than half consisted of scattered Pine (McVean and Ratcliffe 1962, Bain and Bainbridge 1988). A 1994 Forestry Authority (FA) survey (*The Caledonian Pinewood Inventory*) estimated that, based on its criteria, there were around 16,000 hectares of Caledonian pine forest, in 77 individual sites. The historical gross loss of this habitat must have affected the Scottish Crossbill adversely, given its apparent dependence on native pinewood and its possible inability to adapt to dense conifer plantations, resulting in a contraction of range and decline in population. However, in recent years the loss of Caledonian pine forest has been halted, and efforts are being made to increase its extent through appropriate management and new planting.

Importance: historically high, now low

Reduction in habitat quality

In parallel with the loss in area of Caledonian pine forests, the quality of this habitat has also declined. Bain and Bainbridge (1988) found for 1957-87 that 1,984 hectares had been underplanted with exotic conifers (mainly Sitka Spruce and Lodgepole Pine), although this process has now been halted. The management of old pinewoods for timber production alone may also render them sub-optimal for pinewood birds, including Scottish Crossbills, although the latter will feed on the cones of Sitka Spruce and Larch as well as Scots Pine.

The implications for Scottish Crossbill conservation are unknown, but may be harmful. For example, Scots Pine is less subject to dramatic fluctuations in annual cone production than Spruces.

Importance: unknown, probably high

Hybridisation and competition

The Scottish Crossbill has only recently been given specific status (Voous 1978), based on proposals from Salomonsen (1963), Hartert (1904) and Knox (1975, 1976). Following its original description in 1904, the Scottish Crossbill had previously been regarded as a subspecies of Common Crossbill *Loxia curvirostra* (eg: Witherby *et al* 1938, BOU 1952, Voous 1960) or Parrot Crossbill *Loxia pytyopsittacus* (eg Hartert and Steinbacher 1932).

Present evidence suggests that although indicative morphological characters (mainly shape and size of the bill) overlap in Common and Scottish Crossbills (the latter tending to be larger), and whilst some vocalisations are diagnostic, different behavioural ecologies keep the populations reproductively-isolated and thereby maintains their specific structural differences (Knox 1975, 1990a). However, Common and Scottish Crossbills are very difficult to separate in the field (Knox 1990b), and full evidence for the differences between the two species has not been published. The most recent research results indicate that Parrot Crossbills are also present in significant numbers within the range of the Scottish Crossbill, and this complicates the situation still further (R Summers *pers comm*).

Fears have been expressed that the planting of exotic conifers adjacent or near to old pinewoods may encourage Common Crossbills to settle and breed following invasions from the continent (R Dennis *pers. comm.*). Common Crossbills specialise on the seeds from Spruce cones whilst Scottish and parrot crossbills prefer Pine cones (Lack 1944). If reproductive isolation was less than total, and a low level of hybridisation was occurring between between any of the species, this would reduce the integrity of *L. scotica* and perhaps even lead to its absorption by *L. pytyopsittacus* or *curvirostra*. However, in the recent studies, all of the eight pairs of birds captured and measured have been 'single-species' pairs, so there is as yet no direct evidence of dis-assortative mating.

Knox (1975), however, recorded Scottish Crossbills and Common Crossbills breeding within 6.4 km of each other on Deeside; Knox (1990a) presents further evidence of recent sympatric breeding. Knox (1990c) details data suggesting long-term sympatry of Common and Scottish Crossbills in north east Scotland for many generations. The possibility of interspecific competition between Scottish and Common Crossbills also exists, even with no interbreeding. Given our limited knowledge of crossbill taxonomy and ecology, and identification, it is difficult to be certain that the isolation between Scottish Crossbill and Common Crossbill is as complete as Knox suggests. However, the evidence for hybridisation or competition, whether assisted by planting of exotic conifers or not, is poor and - at present - insufficient to justify a precautionary approach towards the planting of exotic conifers within or close to old pinewoods on grounds of Scottish Crossbill conservation *per se*.

There is potential for competition with Red Squirrels *Sciurus vulgaris* over Pine seeds, and a study at Abernethy Forest has shown that the two species have developed different

preferences in the areas where both are found together (Summers and Proctor 1995). In this study, crossbills were found to prefer more widely spaced trees and trees with smaller cones

Importance: unknown

Predation:

In years when Red Squirrels are abundant they may take 'many' crossbills' eggs and broods (Nethersole-Thompson 1975), although Nethersole-Thompson doubted that Red Squirrel predation had ever significantly affected breeding populations of Scottish Crossbill. With re-expansion of the Pine Marten *Martes martes* population, this species may also be a significant predator of Scottish Crossbills.

Importance: unknown, probably low

Conservation status and recent conservation measures

United Kingdom

The importance of the Scottish crossbill has been recognised by the inclusion of the species on the list for which UK Biodiversity Action Plans have been compiled (with the RSPB acting as 'lead partner')(Anon, 1995). However, this plan recognises the taxonomic difficulties outlined above, and clarification of this was advocated as a main priority. No specific conservation measures have yet been undertaken for the Scottish Crossbill. Indeed, our knowledge of the species is so poor, that it is not possible to determine what specific actions for the species might be. General measures to assist the conservation of native pinewoods as a whole, however, are likely to have assisted conservation of 'large-billed' crossbills, including land acquisition for reserves, notification and safeguarding of Sites of Special Scientific Interest and the introduction of incentives for the management of native pinewoods, such as the Woodland Grant Scheme (1988).

Aims and Objectives

Aims

To clarify the taxonomy of Scottish Crossbills with relation to other European species. In the short-term to maintain the range and population size of Scottish Crossbill. In the medium to long-term, to increase the range and population size of Scottish Crossbill.

Objectives

1 Policy and legislation

1.1 To protect native pinewoods for birds, including Scottish crossbill.

1.1.1 To encourage and promote management of Scots Pine in plantations:

Little is known about the use Scottish Crossbills make of plantations, although anecdotal information suggests they do not make use of dense commercial plantations (Batten *et al* 1990). It may be possible to design commercial Scots Pine plantations to support Scottish Crossbills, especially as Crossbills have been found breeding regularly in 100 year old commercial pine of 500-600 stems/hectare in the Loch Garten/Mallachie area (Taylor *in litt*). Our knowledge of Scottish Crossbill habitat requirements, however, is inadequate and further research is required before prescriptions for either can be developed with any certainty.

Priority: high
Time-scale: ongoing

1.1.2 To avoid the planting of exotic conifers within or close to old pinewoods

No action is considered appropriate to address the specific issue of potential hybridisation of Scottish Crossbills with other species. However, the establishment of buffer zones around old pinewood sites in order to enable their expansion may be of assistance. No action required until completion of action 3.2.3.

Priority: low/medium
Time-scale: ongoing

1.1.3 To designate according to relevant legislation all sites which are known or thought to support populations of Scottish Crossbills.

Priorities should be:

- to identify important unnotified and inadequately designated Caledonian pine forest remnants;

- for Scottish Natural Heritage (SNH) to designate all key sites as SSSIs and SACs and to review and improve site boundaries taking into account the ecological importance of their regeneration and buffer zones;
- for Forestry Enterprise (FE) to designate all of the Caledonian pine forest remnants and other key native pinewood sites in their ownership as Caledonian Forest Reserves;

Priority: high
Time-scale: ongoing

1.1.4 To resist development proposals

Development proposals that would damage Caledonian pine forest remnants and other key native pinewood sites should be opposed.

Priority: high
Time-scale: ongoing

2 Species and habitat protection

2.1 *Institute general measures to create and improve the management of native pinewood for birds including Scottish Crossbill.*

2.1.1 To ensure physical protection, management and creation of native pinewood:

Historically there has been an enormous loss of native pinewoods in the UK, resulting in a contraction of range and decline in population of Scottish Crossbills. However, in recent years the loss of Caledonian pine forest has been halted, and efforts are being made to increase its extent through appropriate management and new planting. Increased financial support needs to be made available to ensure the protection, positive management and creation of these sites under long-term management plans and through SNH management agreements. RSPB native pinewood reserves should continue to be managed to ensure the protection and enhancement of their biodiversity and to achieve a major expansion in good native pinewood habitat.

Priority: high
Time-scale: ongoing

2.1.2 To guarantee by means of land acquisition that significant sites are properly protected and managed

About 20% of the Caledonian pine forest resource (2,370 hectares) is managed by Forestry Enterprise, and a further 7% (825 hectares) by Scottish Natural Heritage (SNH). RSPB currently owns 12% of the Caledonian pine forest - (1,900 hectares). Further acquisition would help to ensure future protection of this habitat and, perhaps more importantly, ensure its management for wildlife conservation, rather than timber production.

Priority: medium
Time-scale: long

3 Monitoring and research

3.1 *To continue studies to clarify the taxonomic relationship between Scottish Crossbill L. scotica, Common Crossbill L. curvirostra and Parrot Crossbill L. pytyopsittacus.*

3.1.1 To increase our knowledge of Scottish Crossbill taxonomy

Research is necessary to clarify the taxonomic status of the Scottish Crossbill in relation to Common and Parrot Crossbills. This is of more than academic interest, as the taxonomic status of the Scottish Crossbill is a reflection of the structural and behavioural isolation it enjoys from Common and Parrot Crossbill. If isolation is less than total, then the linked issues of forest planting and management and the opportunities presented for hybridisation with Common and Parrot Crossbills must be considered (although hybridisation in itself may reduce the Scottish Crossbill's claim to be a full species). The relationships between *L. scotica*, *L. curvirostra* and *L. pytyopsittacus* are currently being explored by biochemical studies into nuclear and mitochondrial DNA, by sonogram studies of calls, and by morphometric studies, largely of bill size and wing length. Field studies are being undertaken to identify the degree of reproductive and competitive isolation that *L. scotica* enjoys from *L. curvirostra* and *pytyopsittacus*. A clearer understanding of these issues may increase our knowledge of the ecology of Caledonian pine forest, which is itself of high conservation priority in the United Kingdom.

Priority: high
Time-scale: long

3.2 *To increase our knowledge of the distribution and population size and trends of Scottish Crossbills and their habitat requirements.*

3.2.1 To develop improved methods for field identification of crossbills

The difficulty of reliably distinguishing Scottish from Common and Parrot Crossbills in the field currently hampers monitoring and research work for the species, which is an essential pre-requisite to undertaking effective conservation action. Improved methods of field identification are currently being developed; by distinguishing the calls and bill shapes of Common, Parrot and Scottish Crossbills.

Priority: high
Time-scale: long

3.2.2 To carry out research into the population and distribution of the Scottish Crossbill, and establish a monitoring scheme

As a consequence of field identification problems in distinguishing between Common, Parrot and Scottish Crossbills (Knox 1990b), the true distribution, population size, and long-

term population trends of the Scottish Crossbill are unknown. Methods for assessing population size, distribution and trends need to be identified, and a monitoring programme instituted.

Priority: high
Time-scale: ongoing

3.2.3 To carry out research into Scottish Crossbill ecology and habitat requirements

Little is known about the detailed habitat requirements of Scottish Crossbills, particularly the factors determining their distribution in relation to food abundance and quality. In consequence, our ability to identify specific conservation actions for Scottish Crossbills is poor. Research studies are required to provide basic information on:

Habitat and food requirements. Information on Scottish Crossbill habitat and food requirements at different seasons is required. In particular, we need to understand the relationship between Scottish Crossbill occurrence and the quantity and quality of pine crops. The role of other food supplies during years of poor pine seed crop is unknown and requires elucidation. We also need to understand the factors influencing the fruiting of Scots Pines within the context of woodland management, to provide information on annual and geographical variations in the pine seed crop and to assess how the Scottish Crossbill population responds to these (ie in terms of survival/mortality; immigration/emigration; food switching; breeding/non-breeding). These studies should include work on coning in pines with respect to tree density and the presumption that Scottish Crossbills do not favour dense pinewoods or plantations.

Predation. The impact of predation on Scottish Crossbill populations has not been assessed.

The results of such studies would be used to produce habitat management guidelines for the Scottish Crossbill, for application in nature reserve management, advice to statutory and private owners and in policy work. **NB:** Improved field identification methods will be required if this action is to be successful.

Priority: high
Time-scale: ongoing

4 Public awareness and training

4.1 *To promote public awareness of the conservation importance of Caledonian pine forests and promote their good management to land managers for the benefit of Scottish Crossbills.*

4.1.1 To promote the importance of Scottish Crossbills, Caledonian pine forests and their conservation

In order to achieve the objectives of this plan it will be necessary to give adequate publicity and promotion to the conservation of Scottish Crossbills and their habitat, but we first have to be clear as to the extent of dependence of Scottish Crossbills on native Scots Pine.

Priority: medium

Time-scale: ongoing

4.1.2 To provide advice to managers of native pinewoods

Areas of native pinewood of importance to Scottish crossbills are managed by the Forestry Commission, SNH, Highlands & Islands Enterprise and private landowners. Insufficient is known of the ecological requirements of the species to prescribe species or habitat management advice for Scottish Crossbills, although a general understanding of the types of pine trees used by crossbills is presented in Summers and Proctor (1995). General management advice in respect of native pinewoods to be planned and implemented through the UK Biodiversity Action Plan's Native Pinewoodlands Costed Habitat Action Plan.

Priority: high

Time-scale: long

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ANNEX 1 - Recommended conservation action by country

United Kingdom

- 1.1.1 Encouragement and promotion of management of Scots pine in plantations
- 1.1.2 Avoidance of planting exotic conifers within or close to old pinewoods
- 1.1.3 Site designation
- 1.1.4 Resist development proposals
- 2.1.1 Protection, management and creation of native pinewood
- 2.1.3 Casework
- 2.1.2 Land acquisition
- 3.1.1 Scottish Crossbill taxonomy
- 3.2.1 Development of improved methods of field identification of crossbills
- 3.2.2 Research into Scottish Crossbill population, distribution and establishment of a monitoring scheme
- 3.2.3 Research into Scottish Crossbill ecology and habitat requirements
- 4.1.1 Promote the importance of Scottish Crossbills, Caledonian pine forests and their conservation
- 4.1.2 Provision of advice to managers of native pinewoods

ANNEX 2 - Definitions:

Throughout this plan, definitions of the different categories of woodland types are as given in the RSPB Caledonian Pine Forests Habitat Action Plan:

- Native pinewood** = woodland composed of tree species native to the area, whether planted or self-seeded. Excludes young or intensively-grown pine plantations
- Caledonian Pine Forest** = remnants of ancient semi-natural pine forest as listed in the Forestry Commission inventory
- Old pine forest** = Caledonian Pine Forest plus long-established Scots pine plantations