

Crofting and bird conservation on Coll and Tiree

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The Scottish islands of Tiree and Coll are of international conservation importance owing to the varied assemblages of wetland birds present in both winter and summer. The conservation interest of the islands is a consequence of, and is maintained by, the interaction between unusual coastal landforms - sand-plain grasslands called machair - and traditional forms of low-intensity agriculture. The long-term conservation of the waterfowl assemblages present on the islands, especially internationally important numbers and densities of breeding waders, requires a mixture of site-based mechanisms to ensure appropriate management of key areas, and also wider policies aimed at the support of traditional agriculture. The range of current policies in place or proposed are reviewed.

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Шотландские острова Колл и Тайри имеют международное природоохранное значение из-за разнообразных сообществ птиц, встречающихся там как зимой, так и летом. Природоохранный интерес островов является следствием и поддерживается за счет взаимодействия необычных прибрежных ландшафтов, песчаных задернованных равнин, называемых махер (machair), и традиционных форм низкоинтенсивного земледелия. Для долгосрочной охраны обитающих на островах скоплений водоплавающих птиц, в частности, гнездящихся куликов, численность и плотность которых имеют международную значимость, необходим комплекс механизмов, пригодных для конкретного места, обеспечивающих подходящее управление ключевыми районами, а также необходима более широкая политика, нацеленная на поддержку традиционного сельского хозяйства. Приведен обзор диапазона современных, уже действующих или предлагаемых действий.

Introduction

Conservation and current farming methods are often perceived to be in conflict in Britain, however, bird studies on the Scottish Inner Hebridean islands of Coll and Tiree (Figure 1) have shown that traditional forms of crofting and pastoral agriculture are the key to maintaining much of the international nature conservation importance of these islands.

Coll and Tiree are very important for both their wintering and breeding birds, as well as much other wildlife. In particular, the islands are important because these species co-exist with, and indeed occur because of, a healthy agricultural system based on crofting (Stroud 1989). Since the late 1940s, modern farming elsewhere in Britain has caused major changes and losses to our native plants and animals (Pain & Pienkowski 1997; Potts 1997; Bientema *et al.* 1997; Evans 1997). There is, however, increasing emphasis by UK Government, the European Union and others on devising

agricultural policies that will have less impact on nature. Extensification, set-aside schemes, Countryside Stewardship and Environmentally Sensitive Areas (ESAs) are some recent policy initiatives.

Recent international meetings of the European Pastoralism Forum have highlighted the great importance of pastoral and low-intensity agricultural systems for nature conservation throughout Europe (Curtis *et al.* 1991; Bignal *et al.* 1994; McCracken *et al.* 1995; Bignal & McCracken 1996). The recommendations from the 1990 Pastoralism Forum meeting stressed that "government funding for rural areas should be directed towards sustaining the social structure, as well as wildlife and landscape. These three components are inextricably linked and support measures must recognise this. Lessons could be learnt using the crofting counties of Scotland as a laboratory and crofting as a model for plural employment systems" (Curtis *et al.* 1991). At this time of the implementation of Common

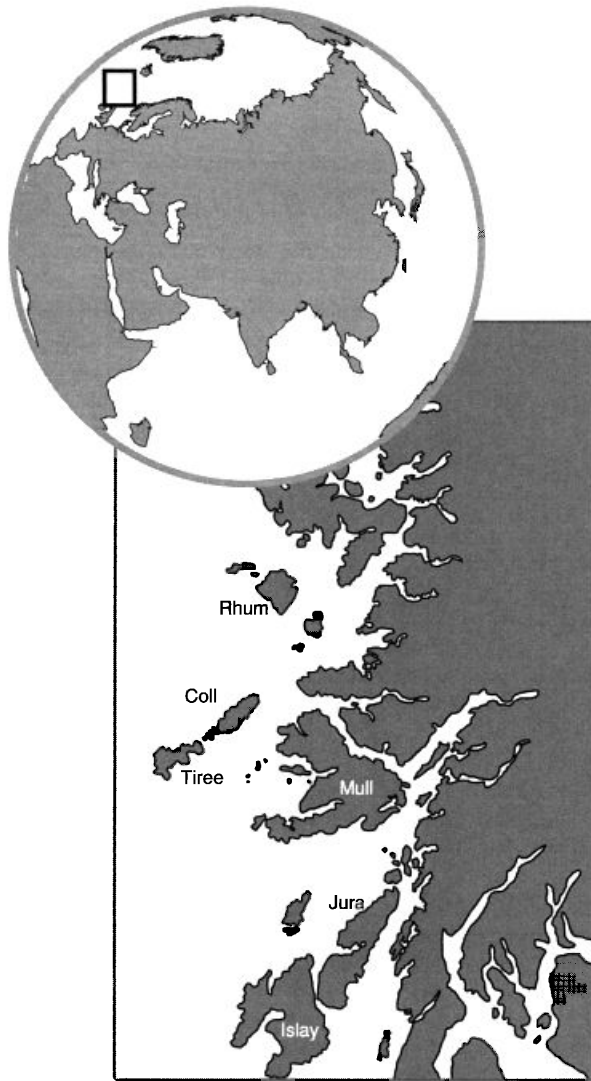


Figure 1. Study area

Agricultural Policy reforms, particularly the Agri-environmental Action Programme (Dixon 1997), knowledge of agricultural practices on Coll and Tiree and their ecological effects may be able to contribute timely and important lessons for other areas.

The Islands

Tiree and Coll lie to the west of Mull in the Inner Hebrides. Topographically, the islands are rather different, although both are generally low lying and have hard, ancient Lewisian bed-rocks. Such rocks weather slowly, so the intrinsic fertility of rock-derived soils is very low. Much of Coll is overlain with acidic blanket peat of very low fertility and with rocky outcrops. A great number of lochans are dotted throughout this moorland landscape.

However, in the south-west of the island, and across most of Tiree, wind-blown calcareous sand, derived from offshore shell-beds, has resulted in the formation of machair and other naturally enriched soils. In some areas there are extensive machair plains and dune grasslands, whilst elsewhere, small fields indicate enclosure and arable cultivation by crofts or small farms. In contrast with the northern

parts of Coll, these areas are highly productive for agriculture, and although only about 8,400 ha in extent, the absolute output of Tiree is equivalent to some of the much larger Hebridean islands. The principle agriculture on Tiree is store beef and store lamb production and the mild winter climate allows the outwintering of stock (Harrison 1989).

Coll is dominated by several medium and small-sized farms. Tiree is more densely populated, with 205 crofts supporting 80-90 crofting tenants dependent on agriculture for the main part of their livelihood.

Crofting is a unique form of land tenure found only in certain counties of north and west Scotland. The history of crofting is complex, and has its origins in the wide-scale dispossessions of The Clearances and the repressive social attitudes of many Scottish estates to their tenants in the 18th and 19th centuries (Prebble 1963). This resulted in the enlightened 1886 Crofting Act which granted security of tenure to tenant farmers - crofters - and ended a long era of eviction and oppression by establishing the Crofters Commission as a judicial tribunal to uphold crofters rights.

The ownership of a croft (a small holding) is usually derived hereditarily, and a feature of most crofts is that their small size will not support a family through derived income alone. Thus, the crofter often has several sources of income and hence crofting is referred to as a plural employment system. The peculiar legal status of crofts and crofting has given a certain stability to land-use in the areas where it occurs. However, changes have occurred, as outlined by Clarke (1991) who documented agricultural trends in the Inner Hebrides back to the earliest collection of regular farming statistics in 1866.

Not only is the crofting system limited to certain parts of the Scottish Highlands and Islands, some important wildlife habitats are equally restricted. Machair grasslands develop under a very limited range of environmental conditions in Europe. The most extensive tracts in Britain occur in the southern islands of the Outer Hebrides. There they are cultivated on an arable/fallow rotation and support internationally important populations of breeding waders (Fuller *et al.* 1986) as well as much other conservation interest. The machairs of Tiree and Coll are somewhat different in that they are largely permanent grassland, although there are also areas that regularly hold arable crops.

Tiree is very low-lying and much of the central plain of the island lies less than 10 m above sea-level. As a consequence, drainage is naturally poor and ditches and other watercourses rapidly fill in with sand blown from the wide beaches that surround the island. There has thus been extensive development of natural wetland areas, particularly those of a marsh/fen nature. Prime among these is the Reef, stretching across the full width of the

island. This is one of the largest machair plains in the Hebrides and an area of unique importance, not only for the important bird populations it supports but also for the extremely rich communities of calcareous marsh and fen plants. This communally grazed area is used heavily by cattle for the six winter months from the beginning of November to the end of May, and by the spring the vegetation on the plain has been reduced to a tight sward. During summer, a luxuriant herb-rich vegetation develops.

The tall herbs keep the grassland from matting, so that by late autumn when the cattle are again introduced, there are once again large reserves of forage for the initial winter grazing (Wormell 1989). Especially on the Reef, but elsewhere also, are small areas of marshes and fens interspersed amongst fields and machair. These provide a small scale mosaic of habitats important for birds. Of particular importance for some species are extensive beds of Yellow Iris *Iris pseudacorus* which provide spring cover for birds such as Corncrakes *Crex crex* before the growth of the hay meadows.

Small fields are scattered across both islands. Generally, levels of agricultural intensification have been low, although there is an increasing tendency to desert the traditional mulching of fields with seaweed and instead apply fertiliser straight from the sack. Indeed, substantial areas of Tiree are reseeded and now receive inorganic fertilisers (Harrison 1989).

The different habitats and vegetation zones of Tiree have distinct agricultural roles. Both the coastal sand dune machair, and the sliabh - wet shallow peat in the inland part of the island, are used for common grazing. Elsewhere, peat based soils enriched by shell sand are used for crops. Such soils however, are deficient in some trace elements - especially cobalt and copper. As detailed by Harrison (1989), this problem has resulted in a unique land-use system, especially with regard to common grazings. Most crofting townships (villages) have their own allocated permanent grazings where each crofter has a number of shares

related to the souming of his croft. The souming is defined as the winter carrying capacity of the croft for cattle and sheep. In the past, animals were regularly moved in the course of the winter between areas of coastal machair and inland sliabh to avoid cobalt deficiencies (Harrison 1989). This is maintained in most areas to this day, and has important conservation implications in that the machair area can be left largely ungrazed in summer, contributing to the growth of winter fodder and reducing losses of birds nests through stock trampling.

Birds of agriculture

In winter, the islands are host to two species of Greenland geese (Table 1). White-fronted Geese, *Anser albifrons flavirostris*, occur widely through both islands and rarely conflict with agriculture, tending to occur especially in the wetter areas. The Reef is of international importance both as a feeding area and as a roost and this wide plain, rarely visited by man in winter, provides excellent undisturbed feeding (Fox *et al.* 1989, 1994). Protection of this area and other roosts is provided through their status as Sites of Special Scientific Interest (SSSI). Drainage has occurred at some other sites and may cause problems if continued and expanded. Drainage and intensification of agriculture on previously wet, species-rich grasslands may affect Greenland White-fronted Geese by enabling increased winter farming activity and hence disturbance. In Ireland, such increased disturbance has caused several flocks to decline or become extinct (Norriss & Wilson 1989; Fox *et al.* 1994). However, this aside, the current forms of low-intensity farming are clearly favourable for Greenland Whitefronts with the widespread, wet feeding areas being particularly attractive.

Conflicts between geese and farmers sometimes arise when large numbers feed intensively in small areas, as occurs on parts of nearby Islay. At present the Barnacle Geese *Branta leucopsis* on Coll and Tiree are generally well tolerated and they use a restricted area, with a roost on the small uninhabited island of

Table 1. Peak counts of geese on Tiree and Coll and appropriate national population estimates (from Fox *et al.* 1990, 1994 and Cranswick *et al.* 1997).

	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
Greenland White-fronted Geese							
Tiree	987	941	1,101	418	499	512	1,387
Coll	671	792	621	438	896	1,026	962
Biogeographic population size	26,676	27,109	28,875	26,117	29,568	30,459	
Greenland Barnacle Geese							
Tiree	581	1,012	1,535	984	684	1,145	1,465
Coll	343	275	670	3,093	764	991	682
Biogeographic population size	34,550				38,388		
	(in spring 1988)				(in spring 1994)		

Table 2. Estimates of national breeding wader populations in the mid 1980s (from Stroud *et al.* 1987), estimates of total breeding wader populations on Tiree and Coll, and percentages of national populations breeding on Tiree and Coll in the late 1980s (adapted from Shepherd & Stroud 1991).

	National (GB) population in late 1980s	Estimated population size (pairs) on Tiree (and % GB)	Estimated population size (pairs) on Coll (and % GB)
Lapwing	181,500	3,000-3,500 (1.7%)	500-1,000 (0.3%)
Redshank	32,100	600-800 (1.9%)	125-150 (0.4%)
Oystercatcher	33-43,000	620-800 (1.4%)	150-200 (0.3%)
Ringed Plover	8,600	250-400 (2.9%)	30-50 (0.3%)
Dunlin	11,000	350-600 (3.2%)	20-40 (0.2%)
Snipe	29,600	1,200 - 2,000 (4.1%)	500-1,000 (1.7%)
Curlew	33-38,000	0	4 (-)
Total		6,020-8,100 pairs	1329-2,444 pairs

Gunna. The geese currently use a range of agriculturally intensified fields, as well as coastal and dune grasslands. These are clearly of importance in their current state and intensification of such grasslands would lessen their value as relatively undisturbed refuges. If such areas were to be more intensively managed, geese may then be disturbed more frequently. This might lead to redistribution, bringing these birds into wider conflict with agriculture. It is to be hoped, however, that the current tolerance will continue.

Greylag Geese *Anser anser*, most probably of the native north Scottish population, are resident on the islands and have been increasing in numbers in recent years. In line with the increased numbers there has been an increased level of complaints of damage in some areas, although it is hoped that recent conservation initiatives, outlined below, will provide a solution to these problems.

The shallow base-rich lochs of Tiree hold a great variety of breeding and wintering ducks, including several ducks rare elsewhere in Britain. In late summer, the large Loch a'Phuill on Tiree is of importance to moulting Mute Swans *Cygnus olor* some of which are known from ringing studies to come from the Uists. In autumn and spring large numbers of migrant wildfowl use these lochs, particularly Whooper Swans *Cygnus cygnus* which nest in Iceland and pass through en route to eventual wintering areas in Ireland. Important numbers of these swans also over-winter and large numbers of sea-ducks such as Eiders *Somateria mollissima* and other wildfowl occur off-shore. Ducks and swans can tolerate moderate amounts of infrequent disturbance, but great disturbance (for example caused by water-sports such as sail-boarding on the larger lochs) can cause particular problems during the breeding season (March to July), since birds are kept off nests, increasing risks of desertion and predation. The growing popularity of the islands as a holiday haunt is likely to give increasing problems of disturbance in some localities.

In summer the islands, particularly Tiree, are exceptionally important for breeding waders

(Shepherd & Stroud 1991). There is diverse assemblage of these wading birds, in particular large numbers of Snipe *Gallinago gallinago*, Ringed Plover *Charadrius hiaticula*, Dunlin *Calidris alpina*, Redshank *Tringa totanus*, Lapwing *Vanellus vanellus* and Oystercatcher *Haematopus ostralegus*. Surveys undertaken by the former Nature Conservancy Council in 1987 and 1988 indicated that over 6,000 pairs of wader bred on Tiree, and over 1,300 on Coll, with nationally important numbers of all six species listed above (Table 2). The combination of high numbers and several species make the conservation of their habitats important. Elsewhere in Britain, lowland populations of waders, such as Redshank and Snipe, have greatly declined (O'Brien & Self 1994; Beintema *et al.* 1997), whilst upland waders, such as Dunlin, have been reduced by peatland afforestation, for example in the Flow Country (Stroud *et al.* 1987), and have declined considerably elsewhere in Europe (Beintema *et al.* 1997).

Different numbers of waders occur in different habitats. The highest overall numbers occur on dry machair - a function of the relatively great extent of these areas. However, the greatest densities occur in marshy areas, and here there are also very large numbers despite the small total area (see Shepherd & Stroud 1991 for full discussion and data). These wetlands are of particular importance since they are used by waders especially for feeding on small insects and other invertebrate food. Wet fields are good areas for such insects and thus are important feeding sites. The intimate mosaic of wet and dry habitats are of value, since they allow family groups of waders such as Redshanks to move not only between nesting and feeding areas, but also between different feeding areas as the summer progresses. Many important wader breeding areas (such as the Reef - Figure 2) are grazed by cattle at other times of the year. The role of cattle in creating and maintaining micro-topographical features important in nest site selection, and nest and chick camouflage has been highlighted by detailed studies in the Outer Hebrides (Jackson 1988).

This exceptional natural interest for waders occurs throughout the islands and whilst special attention can be given to the highest concentrations, it is

Table 3. Breeding densities (pairs/km²) of waders found within habitats surveyed on Tiree and Coll. Habitats are listed in order of decreasing overall wader densities and those containing above average densities for individual species are indicated by an asterisk. From Shepherd & Stroud (1991) who also define habitats.

Habitat	Overall wader density	Lagopus	Ruffe	Golden Plover	Ring-billed Gull	Wigeon
Old runways ¹	2,500.0			100.0*	2,400.0*	
Marshes and fens	750.9	22.9*	128.4*	9.2*		90.4*
Wet machair	220.9	29.2*	8.4*	9.2*		71.5*
<i>Phragmites</i> beds	163.8		15.3*			
Coarse wet pasture	135.5	36.5*	12.4*	8.5*	1.3	5.6
Short wet heath	107.2	29.0*			14.5*	49.2*
Wet acidic grassland	93.8	3.3	2.4	0.9		11.9*
Dry machair	66.8	37.7*	3.7	8.0*	1.7	10.7*
Plough	57.4	30.6*			26.8*	
Uniform wet pasture	45.0	10.2	1.2	3.8*		
Coarse dry pasture	40.3	17.6*	4.4*	8.8*	4.4*	
<i>Juncus</i> beds	40.0	6.1	3.1	6.1*		
Dry acidic grassland	37.0	8.1	2.0	5.4*		2.7
<i>Iris</i> beds	29.0	10.6	10.6*	2.6		2.4
Uniform dry pasture	22.9	16.3*	1.8	3.7*	0.4	0.7
Short dry heath	18.7	7.8	3.1	7.8*		
Intensified pasture	17.5	7.0*	3.5	7.0*		
Blanket bog	15.0	0.4	0.4			
Dunes	6.8	4.9	1.2	0.6		
Deep heath	6.8	0.6	0.1			0.5
Overall mean density		11.8	4.1	3.2	2.2	8.5

¹ located on dry machair.

important that sensitive management for these birds is undertaken throughout the islands. In most areas of Europe, even the parts of Coll and Tiree with low numbers of waders would be considered unusually important (Shepherd & Stroud 1991). Elsewhere, only in the very rich natural fen systems of Poland, a few areas of Iceland and in some areas of the Low Countries do wader breeding densities approach those found on these machairs and those of the Outer Hebrides.

Tiree and Coll are particularly important for birds of arable crofting areas, such as Corn Buntings *Miliaria calandra* and Corncrakes. These birds have now disappeared from most other parts of Britain and Ireland. Indeed, Tiree alone now holds at least 1 in 5 of the entire Corncrake population of western Europe - a ratio that increases every year as populations elsewhere continue to crash (Williams *et al.* 1991; Tucker & Heath 1994). The conservation of these significant numbers on Tiree and Coll is extremely important to maintain a stronghold for these birds from where they could re-colonise areas in which they no longer occur. The survival of these birds will largely depend on the continuation of traditional crofting practises. The trend towards production of greater proportions of silage rather than hay, however, threatens Corncrakes here as elsewhere since silage is cut earlier than hay and kills significant numbers of Corncrake chicks before they are large enough to escape the mowers.

Not only is the date of hay mowing important to minimise Corncrake mortality, but so also is the style of hay mowing. Results from RSPB/NCC

studies in the Uists have indicated that such deaths can be greatly reduced by mowing hay from the centre of fields to the outside, rather than from the edges in towards the middle (Williams *et al.* 1991). This allows young Corncrakes to escape into adjacent fields rather than being trapped in a central island of uncut hay. In recent years, a resident RSPB summer warden on the islands has encouraged the adoption of Corncrake-friendly hay-mowing. This has had some considerable success and has fostered good relations with islanders.

Most seabirds occur on cliffs where nest sites are generally secure from major disturbance. However, three species of terns also breed more accessibly on open ground around the coasts, including the scarce Little Tern *Sterna albifrons* (Broad & Cadbury 1989). Disturbance of these terns during the breeding season has caused major problems at nesting colonies in other areas. Whilst such disturbance on Tiree is currently less than elsewhere in Britain, there is a need to maintain disturbance at low levels in areas which may receive greater use. A greater degree of tourism may give problems.

Integrating conservation and development needs

What is it about present farming on the islands that sustains such a high level of conservation interest? Tiree, and to a lesser extent Coll, are well known for their cattle rearing. Tiree has a sheep-to-cattle ratio of 3:1 in contrast with 16:1 on Mull. Many features of conservation interest are sustained by an extensive pastoralism based on cattle. The

importance of such pastoralism to conservation has been shown by recent detailed studies on Islay (Bignal *et al.* 1989) and is increasingly being recognised at an international level (Curtis *et al.* 1991; Bignal *et al.* 1994; McCracken *et al.* 1995; Pain & Pienkowski 1997).

Hay grown for fodder provides invertebrate rich, dense cover for Corncrakes, Corn Buntings and waders. Small-scale, weedy arable cultivation also provides ideal habitat for Corn Buntings and Corncrakes, and the autumn stubbles are valuable feeding areas for geese arriving from the far north. Winter cattle grazing in other areas provides a rich supply of dung and creates tussocky, wet grasslands which are valued by nesting waders such as Snipe. Agricultural intensification also becomes particularly damaging to bird populations if it encourages large scale uniformity of habitat. The existing small-scale habitat mosaics are a function of the crofting land-tenure system with complex, traditional grazing regimes. The maintenance of all these features directly relates to the continuation of the current agricultural regime.

The islands are unusual in Britain in that their traditional small scale forms of crofting and pastoral farming have survived late into the 20th century. These practises are, however, already being changed by modernisation, with the current agricultural economics and the easy availability of new technology leading to an attrition of some features of conservation importance. Many of the changes are subtle in an agricultural sense but can have profound nature conservation implications in the long-term. As Clarke (1991) noted, farming practises have changed in the past, so why worry about present changes? Now, however, knowledge from recent ecological studies allows us to predict the consequences of current changes: generally, they will degrade those features that not only make the islands of international importance for their birds, but also sustain the conservation interest for other groups.

Whilst there are some areas of extremely high conservation importance (particularly marshy areas, with their very high densities of breeding waders) where site-related designations are appropriate, the whole agricultural landscape of these islands is of great importance, especially in comparison with other, more intensively managed farmland elsewhere in Europe. Clearly, islanders who have developed and maintained these sympathetic farming systems must not be disadvantaged by their continued maintenance. It is of significance that most visitors come to the islands to appreciate the high wildlife interest and landscape of the islands. Such a high quality environment has great potential for wildlife-tourism which can give valuable input to the local economy and support for local transportation and other services. In such small islands however, tourism can bring problems of disturbance to sensitive species and habitats,

especially in the breeding season.

For islands such as Coll and Tiree, but also more widely in the Hebrides, agricultural policies must continue to support these existing beneficial forms of farming. There are a number of ways this can be achieved.

The EEC-sponsored Agricultural Development Programme provides opportunities for such sensitive development, but there are also risks. The programme takes account of conservation interests, but funds allocated to this element have been very low compared with the rest of the budget. It is important that such future schemes take account of the unusually high levels of conservation interest and also the need to preserve long-standing farming and crofting systems. Subtle shifts of agriculture, for example from cattle to sheep rearing or the individual apportionment of common grazings, could have major effects on the conservation interest of the island by modifying the type and style of grassland management (Harrison 1989).

The conservation importance of Coll and Tiree is great. As in other areas, such as nearby Islay, conservation needs to maintain viable human populations to sustain wildlife (Egdell *et al.* 1992). Much conservation interest is directly related to existing systems of agriculture. In this situation, taking land out of production - setting it aside or abandonment - will be actively damaging to nature conservation (Baldock *et al.* 1996). As on other Hebridean islands, conservation policies on Coll and Tiree must ensure maintenance of traditional crofting and farming practises, and human populations (Egdell *et al.* 1992). This is the key to the sustenance of the islands considerable wildlife heritage.

The announcement by the Scottish Office of the Argyll Islands ESA was a considerable step forward. This means that any crofter or farmer will now be able to enter into a management agreement to continue farming at existing levels of intensity or adjust to a lower intensity of farming without financial disadvantage.

In some areas, other positive means of protection for particularly important areas are appropriate. The 1991 Scottish Natural Heritage Act enables management agreements to be offered to owners of land outside designated areas, and several such agreements are already being negotiated. In addition, there are a number of SSSIs on the islands. Such notifications ensure consultation with Scottish Natural Heritage (SNH) over any potentially damaging land-use changes and thus give opportunities for positive conservation management. In recognition of their international importance, key areas on the islands have also been listed as qualifying for designation as a Special Protection Area under the EEC Birds Directive and as internationally important wetlands under the

Ramsar Convention. In 1991 the RSPB announced the purchase of a considerable area of Coll, to be farmed on a traditional basis and with policies especially targetted towards Corncrake conservation. This has already achieved considerable success.

In 1992 RSPB also launched, with support from SNH and the Scottish Crofters Union, a Corncrake grant scheme to encourage crofters and farmers to delay the harvesting of hay fields until late enough to avoid the destruction of young Corncrakes (Green & Williams 1994).

Through all these means, it is hoped to ensure the conservation of the habitats, animals and plants as well as the farms and crofts which support them, on these unique islands.

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