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CONSERVING SCOTTISH MACHAIR  
A' DÌON MACHRAICHEAN NA H-ALBA

## WILDLIFE AND THE MACHAIR

A short explanation about the machair on the Uists, the abundant wildlife it hosts and the vital part crofting plays in maintaining this unique working landscape



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# THE MACHAIR LIFE+ PROJECT

The Conserving Scottish Machair LIFE+ is a four year project which ran from January 2010 to March 2014 and aimed to demonstrate that traditional crofting practices have a sustainable future. The project focussed on machair within designated Natura 2000 sites which occur mainly on the Uists, but also encompass areas of Lewis, Barra, Coll, Tiree, Islay, Colonsay and Oronsay. Its success has helped towards securing the immensely important conservation value of the unique machair habitat.

Machair LIFE+ is supported by the European Union LIFE+ scheme, and managed by The Royal Society for the Protection of Birds (RSPB) in partnership with Scottish Natural Heritage (SNH), Comhairle nan Eilean Siar (CnES) and the Scottish Crofting Federation (SCF).



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## What is Machair?

Machair is rare, bio-diverse coastal grassland, unique to the north-western fringe of Europe. It is listed on Annex 1 of the EU “Habitats Directive”, and covers a total global area of just 19,000 ha, with 70% of this in western Scotland, mostly on the offshore islands, and the remainder in western Ireland.

Machair is generated by an exceptional blend of physical factors, including climate, substrate and topography, combined with longstanding human influences. It forms when sand with very high shell content blows landwards by prevailing westerly winds, creating a fertile, low-lying plain. For generations, man has worked and moulded machair in a low-intensity crofting system that has created a mosaic of open habitats. Working the machair is a huge part of Gaelic culture.



## CROFTING TODAY

Traditional crofting systems are the heartbeat of biodiversity across the machair landscape and excellent examples of High Nature Value Farming. Machair has been traditionally cropped with oats, barley, rye and grass to produce feed for cattle and sheep stock. Since the cropped land is left fallow for two to three years between crops, it allows for the growth of annual and perennial plants which attract seed-eating birds, such as the corncrake and corn bunting, and nectar-loving insects, as well as providing key nesting and feed sites for large populations of waders, for example the migratory dunlin and ringed plover.

However changes in agricultural practices have occurred that threaten the condition of machair habitat and the conservation status of key flora and fauna populations. The ability of crofters to maintain traditional practices is increasingly under pressure; contributing factors include loss of manpower to collect and spread seaweed and to harvest and stack crops by reaper binder, and an increase in the greylag goose population which causes damage to crops. The project was therefore set up to assist crofters in retaining their traditional practices which support the machair's rich wildlife, while still maintaining viable crops for stock. Monitoring key biodiversity affected by these changes was also a vital part of the project remit.





## HOW THE PROJECT SUPPORTED TRADITIONAL ARABLE CULTIVATIONS

During the four-year period, working with crofters on the machair, the overarching aim has been to improve the conditions for habitats and species through encouraging agricultural management practices including:

- Increase the use of seaweed as a natural fertiliser
- Provide and promote shallow cultivation by plough or rotavator
- Encourage the harvesting of arable crops with a reaper-binder
- Encourage the later cutting of arable silage
- Increase the area of machair used for arable crops
- Provide incentives to increase quantities and quality of Uist seed
- Provide crop protection schemes on the Uists and Benbecula, Coll and Tiree including greylag goose population counts

Machair LIFE+ purchased key machinery to collect and spread seaweed for nearly every Western township on the Uists and carried out cultivations and traditional harvesting for crofters with whom they set up management agreements. More than £125 K of grants has been paid to crofters on Uist over the four years for late cutting arable silage, making arable stacks and harvesting seed options. The following table shows the key land management targets the project achieved:





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	TARGET	2010	2011	2012	2013	TOTAL
Management agreements	150 (lifetime)	N/A	30	59	80	169
New areas for cultivation	15ha (lifetime)	N/A	4ha	3ha	9.9ha	16.9ha
Seaweed spreading	30ha (per year)	N/A	47ha	96.5ha	175ha	318.5ha
Shallow cultivations	20-40ha (per year)	N/A	38ha	41.2ha	72.4ha	151.6ha
Harvest by reaper binder	(no target set)	N/A	12ha	18.7ha	14ha	44.7ha
Late cut arable silage	<60ha (per year)	47ha	40ha	103.6ha	102.6ha	293.2ha
Arable stack scheme	(no target set)	71 stacks	57 stacks	50.5 stacks	56 stacks	234.5 stacks
Harvesting seed	(no target set)	22ha	24ha	18.7ha	34ha	98.7ha

*Note: In 2010 the project had no machinery and in 2014 the project collected more than 1000 tonnes of seaweed which was spread by others.*



## MONITORING KEY BIODIVERSITY IN ARABLE MACHAIRS

Four years of fieldwork to survey flora and invertebrates on the Uist machairs began in 2010. Surveyors from Applied Ecology Ltd, spent much of the summer collecting valuable data on the wildlife of arable machair habitats.

Sixty plots of machair were selected to record botanical diversity. The surveyors also used pitfall traps to collect invertebrates, while transects were walked to study pollinating insects such as bees. Soil samples were also taken from each plot to allow assessments to be made both of the soil structure itself and the invertebrates living within it. Key findings from this work are detailed below:

The project is also grateful for assistance from two volunteer surveyors from the Museum of Wales and University of Sussex who completed a programme of sampling Hemiptera (bugs) in July 2012 and 2013.

**FLORA:** Four arable weed species with a high level of nature conservation interest were found to occur: corn gromwell, corn marigold, common rampion, fumitory and corn spurrey. These rare arable weeds were more closely associated with the cropping stage of the rotation, although corn gromwell was more frequently recorded in the fallow plots.





**POLLINATORS:** Distinct plant and pollinator groups are associated with the different phases of the crop rotation cycle. Bumblebees and the northern colletes are associated with fallow plots whilst hoverflies are found in cropped plots. Three pollinator species of nature conservation importance were recorded in variable numbers: great yellow bumblebee, the northern colletes and a hoverfly, *Anasimyia lunulata*.

**SEAWEED:** The use of seaweed as organic fertiliser has shown positive benefits for wildlife as well as crop yield. Some key plants that support target flagship species (i.e. great yellow bumblebee and twite) preferred sites that had been treated with a higher percentage of seaweed rather than inorganic fertiliser. In plots treated with seaweed, there was an increase in the occurrence of white clover, bird's-foot trefoil and spear thistle: plants that are important forage species for bumblebees.

**BEETLES:** A total of 238 beetle species were recorded over the four year sampling period of which 25 species are of nature conservation importance, including three Red Data Book species: the Siphid beetle, *Thanatophilus dispar*, the Dryopid beetle, *Dryops similis* and the weevil, *Ceutorrhynchus cakilis*. Beetles also showed more abundance on plots where flora richness and vegetation/sward height was greatest and on plots treated with seaweed.

The work on Hemiptera also showed an effect of crop versus fallow, but while it was not possible to include these results in the final analysis, the work has added much to the wider understanding of biodiversity on the machair.

## BIRD MONITORING

Machair supports diverse and abundant populations of birds due to low intensity farming/crofting management and the relative scarcity of ground predators on islands. 50% of the Great Britain (GB) breeding population of the rare corncrake and 10% of the GB breeding population of chough are found in the project area. These are both vulnerable fragmented populations. Wading birds breed on machair in exceptionally high densities and machair supports internationally important populations of ringed plover and dunlin.

Surveys were carried out to evaluate the effect of the crofting system on specific birds to gain an understanding of the impact of project actions. Over the four years RSPB staff and specialist sub-contractors monitored breeding corncrake, chough, corn bunting and also wader populations. Here are some of the findings:



Chough  
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Dunlin  
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**WADERS:** Seaweed application and rotavation had a very strong effect on adult feeding counts. Wader feeding counts were influenced by the stage of crop rotation. Target species of ringed plover and dunlin preferred to feed in cropped plots, whilst redshank, oystercatcher and lapwing used cropped and fallow plots. Whilst all species were recorded to some extent feeding in uncultivated plots, no species showed a preference for this habitat over cropped or fallow plots.



As for other birds it is likely that the prolonged cold spring in 2013 had a strong effect on the breeding success of wader species, particularly for migratory birds that might not have made it to their breeding grounds.

**CORNCRAKES:** It was difficult to measure the effect of specific project works on corncrake as they use areas outside the Natura-designated cropped machairs for breeding and feeding which were not in the project remit. Again the weather had a strong effect on corncrake numbers in 2013, with 263 calling males in the Uists and Benbecula in 2012 and 168 in 2013. The long-term outlook for corncrake is of an increasing population in the Scottish Islands, likely to be a result of the targeted conservation actions such as those supported by the project. The introduction of late-cutting dates for arable silage in the next Scottish Rural Development Programme and ensuring that plots continue to be cut in a 'wildlife-friendly' way will further benefit corncrake.

**CHOUGH:** Over the lifetime of the project, the conservation measures put in place have increased the breeding population of chough on RSPB-managed land at Smaull Farm, Islay and Ornsay & South Colonsay, from six to seven pairs and maintained a similar level of fledging success. A new shed to assist with land management for corncrake and chough was also built with project funds.



**CORN BUNTING:** The number of territorial males in the Uists, Benbecula and Barra and Vatersay has gone down from more than ninety birds in 2010 to just fewer than fifty in 2013. There was only one territorial male recorded on Benbecula and no birds recorded on Barra and Vatersay in 2013. The northern part of South Uist is likewise almost devoid of birds despite being one of the areas where making corn stacks still takes place. This leaves parts of North Uist and the southern part of South Uist as the last remaining strongholds in the Western Isles. This is a very vulnerable population and presents a concerning picture.

The fall in the numbers in these islands is linked to a decline at the national scale, with birds in the Western Isles representing an especially isolated population in a remote location. This decline has followed intensification in agricultural practices since the 1970s. Traditionally the cereal harvest was made into stacks that were fed out daily to cattle during winter, providing a constant, widespread and plentiful supply of food to birds. A change from traditional harvesting techniques to whole crop arable silage has removed this once plentiful supply of ripe grain as a food source for corn bunting.

Whilst a number of conservation measures have been implemented to benefit corn bunting, including payment for stacks over the project lifetime, these are clearly not having the required impact. Significant action implemented through effective agri-environment schemes is urgently required.





## OUTCOMES OF BIODIVERSITY MONITORING

The detailed results of these studies indicate that maintaining traditional cropping patterns on the machair using crop-fallow rotations creates a small-scale habitat mosaic that maintains species of high nature conservation value.

Patterns of arable plant and invertebrate species abundance were shown to be influenced strongly by the type of crofting land use, with fallow land and land under crop showing distinctly different assemblages of plant and animal species. The true value of the cropped machair system to wildlife is the sum of its parts.

For this reason, maintaining and indeed increasing the area of arable machair brought back into a cropping rotation, using traditional management techniques, has positive benefits for all these species and habitats.

These studies suggest that there are overall positive effects of traditional crofting practices: seaweed as a fertiliser and very shallow cultivation, not only on target species, but also on the wider biodiversity that makes the machair such a complex and unique ecosystem.



*“The data collated over the project lifetime has helped to inform the new round of the Scottish Rural Development Programme (SRDP) and will continue to influence long term agricultural policy and its effect on wildlife. Through supporting and working with crofters, Machair LIFE+ hopes to leave a lasting legacy by raising awareness of and promoting these sensitive and unique methods of working the land.”* Jeremy Wilson, Head of Research, RSPB Scotland

The detailed results of these studies are available from RSPB Scotland in the ‘Report on Biodiversity Outcomes 2014’. Contact Robin Reid, Western Isles Conservation Officer - tel: 01859 550463, email: [robin.reid@rspb.org.uk](mailto:robin.reid@rspb.org.uk).



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## Conserving Scottish Machair LIFE+ Project Layman's Report - Booklet 2/3

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