

Progress towards favourable condition - Case Study examples

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Case Study 1: Dunkeld and Blairgowrie Lochs Special Area of Conservation (SAC), Perth & Kinross

This internationally important area in East Perthshire covers a chain of five lochs between Dunkeld and Blairgowrie. It is important for what are described as 'clear water lochs' and the plants and animals they support.

The natural state of the lochs was found to be threatened by excessive phosphates, mainly from inorganic fertilisers, soil and manure being washed into them. This was causing changes to the water quality and damaging the plants and animals which lived there.

In response to this 14 land managers and three public agencies, Scottish Natural Heritage (SNH), the Rural Payments and Inspectorate Division (RPID) and the Scottish Environment Protection Agency (SEPA), developed a management scheme under SNH's Natural Care programme. Through this, land managers have reduced the application of inorganic phosphate fertiliser, adhered to phosphate budgets and waste management plans and ploughed cereal crops later than usual. They have also created grass buffers, reverted to grass in flood risk fields, made steading improvements and fenced watercourses from cattle.

The scheme will cost a total of £351,000 over six years. It has already resulted in a significant reduction in total phosphorus entering the lochs especially during periods of heavy rainfall, 'storm events'.

Mr Donnie Laing, Farm Manager of Forneth Estates commented "We were initially wary when first approached by SNH about joining a Lunan Lochs Management Scheme; however, we've found participating a positive experience. Through the Scheme we've been able to make changes that have improved our farming efficiency and also benefitted wildlife on the farm. The advice from specialists has been welcome when considering the practicalities of how best to address diffuse pollution issues. Our Management Agreement with SNH ends this year, and we hope to continue the work through the Scottish Rural Development Programme."

Case Study 2: Renfrewshire Heights Special Protection Area (SPA), Inverclyde/Renfrewshire/North Ayrshire



©Tommy Loudon/SNH

Renfrewshire Heights - Dungeon heft & Common Grazings.

Renfrewshire Heights is a moorland plateau between Greenock and Largs. Nearly 9,000 hectares of it has been recognised as internationally important for breeding hen harrier. Inappropriate burning and grazing over a number of years have caused a loss of heather cover and affected not only the habitat but the animals which live there, including the hen harrier.

To help combat this decline 10 land managers have signed up to a management scheme, bringing a total of 8,380ha under sympathetic management. Nearly 8,000ha of this are within the protected place and 400ha are immediately next to it. The scheme started in 2007 and will run until 2014, with a cost of £488,457 for five-year agreements over the 10 landholdings. These will improve habitats chiefly through reduced grazing and more carefully targeted muirburn. Overall the scheme will benefit the full range of moorland wildlife. It has included measures for hen harriers as well as scrub regeneration and fence-marking for black grouse.

One of the landholdings, Hunterston Estate, has a five-year £75,000 agreement over 1,368 ha of the moorland to reduce the number of grazing sheep by 900. At their own expense, the landowner has also disposed of a further 1,000 sheep and implemented a new grazing regime involving 390 sheep and 30 cattle in summer only. On this estate there will be no muirburn throughout the term of the agreement.

These changes will maintain a good diversity of habitats while allowing recovery of heather. Mr Nigel Cochran-Patrick, who has been directing the management on behalf of Hunterston Estate, said "Hunterston estate has fully embraced the newly designated SSSI at Renfrewshire Heights and has embarked on an environmental scheme that will encourage the regeneration and increased biodiversity of their land holding. This is a great opportunity to reverse the desertification caused by years of overgrazing and inopportune drainage schemes of the past. My only worry is that the 5 years that the scheme runs for will only just be enough time to halt the decline; hopefully the scheme will run for a further 5 years to really make a difference. People forget how long things in nature take to grow".

Case Study 3

North Harris Special Area of Conservation (SAC) and North Harris Mountains Special Protection Area (SPA), Western Isles



©Roddy McMinn/SNH

Glen Miavaig – North Harris SAC

This 13,165 ha protected place is internationally important for its upland habitats, namely blanket bog, wet heath, montane acid grassland, dry heath, and alpine/sub-alpine heath. These habitats have been heavily grazed (and trampled) by a combination of deer and sheep in the past, leaving them in poor/unfavourable condition.

The North Harris Trust, working with SNH and the Deer Commission for Scotland (DCS), has joined a five-year £61,000 Natural Care scheme (2005 – 2012). The Trust is monitoring and managing the red deer population at a level that will allow the habitat to recover. Staff and volunteers are monitoring vegetation and deer numbers. This will allow the Trust to further refine its deer management plan to accommodate both natural and economic interests. In addition, the Trust is carrying out best practice management for fragile upland sites such as this, with controls on muirburn and off-road vehicle use.

A deer management plan specifically tailored to let the habitat recover is now in place. Roddy McMinn, Area Officer with SNH commented that: "By closely monitoring changes to the vegetation we have developed a greater understanding of deer numbers and their distribution, and at the same time a better appreciation of the habitats and their condition. We are confident that by working closely with the Trust, these important habitats will recover over time."

Land Manager for the Trust Duncan MacPherson is pleased with progress: "The agreement has allowed us to put significant resources into monitoring, enabling us to make informed management decisions to improve both the conservation value of the habitats and the quality of the deer herd."

Case Study 4

Lower River Spey & Spey Bay Special Area of Conservation (SAC), Moray



©FCS/SNH

preclearance 2007 face wnw



© FCS/SNH

post-clearance 2008 face wnw

The Spey Bay area is the largest vegetated shingle complex in Scotland and is recognised nationally and internationally for its important habitats and species. These include shingle heath, birch and Scots pine woodland, shingle slacks, and fen and carr woodland.

In some places gravel extraction has created artificial hollows which now support outstanding marsh vegetation. This process is being continued to form some more wetland areas. The wide range of habitats also supports breeding bird and diverse invertebrates.

Monitoring has highlighted the risk that gorse and conifers could shade out shingle plants. On the section managed by Forestry Commission Scotland (FCS) the first task was to clear scattered gorse and self-sown conifers from otherwise open shingle. The next task was to tackle the larger clumps of self-sown conifers and gorse, and then prevent further loss of vegetated shingle structures.

Since the start of the work in 2007/8, FCS has invested more than £10,500 on gorse removal and habitat creation. This involved cutting and removing the gorse and treating the stumps. FCS carried out further clearance in 2009 and is planning more in 2010 and 2011. Fixed point photography is recording the changes brought about by the works.

Philippa Murphy, environment manager for FCS, said: "The gorse clearance work is removing the major threat to one of the rarest habitats in Scotland, the coastal vegetated shingle. We will continue to monitor the results of the work we have done to ensure continued improvement and target new areas for clearance."

Case Study 5

Scottish Wildlife Trust Grazing Project, East Central Scotland



©SWT/SNH

Bo'mains Meadow



©SWT/SNH

Flock and trailer

The Scottish Wildlife Trust (SWT) manages nationally important species-rich grasslands in Fife and Falkirk. The grazing regime used prior to 2001 had left the sites in unfavourable condition and declining in quality. A new approach had to be found.

The Trust acquired a flock of sheep initially to move around to graze its own reserves in Fife. Managing this 'flying flock' enabled SWT to bring reliable and effective management to its reserves where suitable stock was not available from local landowners. It is also demonstrating the benefits of conservation grazing to local farmers, landowners and other conservation organisations.

The project initially employed a shepherd and 50 Shetland sheep. SWT bought a four-wheel-drive crew-cab vehicle and a double deck stock trailer to move stock between sites. The Trust also bought a mobile handling system for gathering, penning, foot-bathing and sorting sheep, along with electric fencing to concentrate grazing on particular parts of larger sites. Vegetation monitoring was established at the start of the project and has been going on since 2001.

The project cost around £60,000 to set up and around £30,000 a year to run. There are currently 420 sheep and four cows used to graze twelve sites; five of which are protected grassland sites. Four of the twelve sites are grazed for other landowners who also found it difficult to find local stock to help them manage protected sites. The initial set-up costs were largely funded through the Heritage Lottery Fund. Ongoing costs are currently supported by SRDP, Fife Environment and Communities Fund and income from the flock, largely as a result of lamb sales.

The sheep-grazed grasslands have moved towards favourable condition. The project has highlighted the need to take a flexible and responsive approach to conservation grazing, monitoring environmental changes and adapting the grazing regimes as appropriate.

Alistair Whyte, SWT reserves manager said: "The Flying Flock project has become a successful and important reserve management tool. Our grassland reserves are now moving towards favourable condition, and the project is a demonstration of how conservation grazing can impact positively on grassland sites. The flock is now an integral part of the reserve management process."

Case study 6

Cobbinshaw Moss Site of Special Scientific Interest (SSSI), West Lothian



©Viv Gray/SNH

Cobbinshaw Moss landscape



©Viv Gray/SNH

Cobbinshaw Moss Dams

Cobbinshaw Moss is a wild area of peatland in West Lothian that needs to stay wet. Many of the site's special plants and animals – along with the patterned surface of mosses and pools – would disappear if it dried out. It is therefore vital that trees don't get a chance to grow on the moss, as they suck water out the ground. The only source of water for the moss is rain, so it's also important to block the places where the water can run off.

The owner entered into a Scottish Rural Development Programme (SRDP) contract agreed with SNH and the Scottish Government's Rural Payments Incentive Directorate. Through this he received funding to install stock bridges so that sheep can graze the whole area and eat any tree seedlings that appear. He has also received funding to block more than 200 drainage channels that were created when people worked the peat.

A total of £14,820 has been spent on ditch damming and associated works in year one of the scheme. In addition the land manager will receive £20,347 a year, over the five year term of the scheme, for managing the site with appropriate grazing.

The work has focused on a 490ha area of intermediate blanket bog. The bog around the blocked ditches is already showing signs of becoming wetter.

Viv Gray, the Area Officer for SNH, said "Under the SRDP the landowner has carried out the work himself, acting as project manager and overseeing delivery. The work has been done very efficiently, to a high standard and shows real care for the SSSI. Although it's early days, it is already obvious that the ditch damming work is helping to rewet the site."

Case Study 7

Kinveachy Forest, Special Area of Conservation (SAC) & Special Protection Area (SPA), Badenoch and Strathspey

The Kinveachy SSSI was notified in 1986 on account of its native pine woodland, juniper scrub and woodland and moorland breeding birds. The 5,335 hectare SSSI lies in the Monadhliaths about 30 km south of Inverness and forms one of the largest tracts of remnant Caledonian pinewood in Strathspey. Almost 3,000 hectares of the site is an SPA for capercaillie and Scottish crossbill and SAC for Caledonian forest and bog woodland habitats.

Monitoring raised concerns that heavy grazing by deer may be damaging the important habitats on the site. Kinveachy Estate spoke to Forestry Commission Scotland (FCS), Scottish Natural Heritage (SNH) and Deer Commission for Scotland (DCS) about developing a new management approach that would prevent this. As a result, the estate put in place a 10-year deer management plan aimed at reducing deer numbers then maintaining them at a low level. Estate staff have reduced the deer population and are maintaining deer levels that are compatible with regenerating forest habitats. Monitoring has shown that damage by deer has been avoided and the condition of designated habitats across the protected place has improved.

The Kinveachy Deer Management Plan underpins contracts entered into by the Reidhaven Trust, owners of Kinveachy Estate. The contracts are a Control Agreement (DCS), a Scottish Forestry Grant Scheme (FCS) and a Management Agreement (SNH).

Public money was made available to the Reidhaven Trust to assist with improving the condition of the woodland and wider work to enhance the natural heritage at Kinveachy. The Scottish Forestry Grant Scheme makes provision for £282,000. Around £153,000 of this has already been paid. A further £192,932 has been allocated through the Management Agreement, of which £91,265 has been paid.

Kinveachy Estate has hosted several events to share information about the developments, the challenges encountered and the improvements made. Attendees at these have included local residents, neighbours, members of the Monadhliath Deer Management Group and Government officials.

Sandy Lewis, chief executive for the Reidhaven Trust, said: "The Reidhaven Trust and their staff are committed to enhancing the natural heritage at Kinveachy. The Trust will continue to work in close partnership with key individuals and organisations to continue to enhance the condition of Natura Caledonian forest habitats, and the associated wildlife, at Kinveachy".

Case Study 8

Longbridgemuir Special Area of Conservation (SAC), Dumfries and Galloway

This site, owned and managed by Forestry Commission Scotland (FCS), is among the most important raised mires in Western Europe. It is internationally important for its special plants including bog rosemary, cranberry, white-beaked sedge, sundews, and sphagnum species; bog asphodel and cross-leaved heath. Animals using the site include adder, common lizard, roe deer, hen harrier, snipe, woodcock, various dragonflies and large heath butterflies.

Historical peat cutting, land reclamation for agriculture, and removal of the lagg (shallow peat and fen around the main peat body), were all having a detrimental effect on the site. Afforestation was also drying the bog and smothering the native vegetation under a dense cover of conifers.

FCS, in partnership with SNH, Scottish Wildlife Trust and European Union Life funding, set up a management arrangement to address the concerns. Funding included £280,000 to clear conifers using harvesting techniques adapted to minimise impact on site and install nearly 2,000 dams were installed to hold the water on site. A series of Walrags were also put in place to monitor the water levels after the tree felling. In addition, £60,000 was spent between 2006 and 2008 controlling conifer regeneration.

The vegetation communities have re-established themselves across the site and are developing well. As a result of this work, the raised bog habitat on this site is moving towards favourable condition.

Case Study 9

Inchnadamph Special Area of Conservation (SAC), Sutherland

Inchnadamph is an internationally important site for the range of upland plant communities which have developed on the fertile soils created by the underlying nutrient rich rocks. These communities include species rich, high altitude grasslands, limestone pavements, dwarf willow and vegetation associated with surface water seepage, such as springs.

Trampling and overgrazing by deer was damaging the protected habitat, specifically the montane willow scrub, petrifying tufa springs and dry heath.

Following discussions between SNH, DCS and Assynt Estates, a voluntary Section 7 Agreement was established to guide the deer management. The Agreement came into effect in 2003 and set out details of the habitat condition required, deer densities and cull targets, taking account of the deer densities on surrounding estates. It also set out the monitoring requirements. The deer count, to inform the annual cull, was undertaken by the DCS as part of their national count programme. The deer cull targets were indicative and were reviewed in light of annual habitat monitoring. There was no money associated with the Section 7 Agreement.

The Estate had feared that the level of the deer cull might have a major impact on the viability of their sporting business. However, whilst hind numbers have reduced, the estate is able to maintain an acceptable sporting cull. Jim Payne, Chairman of West Sutherland Deer Management Group commented: "I find a Section 7 Agreement a useful and constructive instrument in resolving habitat and deer number problems at a local level."

Case Study 10

Shirgarton Moss Site of Special Scientific Interest (SSSI), Stirling



© Photoair/
SNH

Shirgarton Moss SSSI aerial 2001



©SNH

Shirgarton dams - Mr Reilly

Shirgarton Moss is one of only two remnant lowland raised mires lying to the south of the River Forth in the Carse of Stirling. Raised bog peatlands of this type used to cover most of the carse land of the upper Forth. It forms part of the Flanders Mosses SAC and is internationally important for its active raised bog.

Until recently, the features on Shirgarton Moss were in unfavourable condition with little active management of the site. The combination of numerous drainage ditches and increasing cover of trees and shrubs was causing the bog to dry out.

Over recent years, SNH has been working with the owners and managers of the site. All four now have management agreements under the South Scotland Bog Scheme (SSBS). The work includes installing plastic piling dams in the ditches, felling trees and scrub and introducing light grazing to help suppress any scrub re-growth. SNH has provided money, plastic piling and training courses on dam installation, but the land managers are carrying out all of the practical conservation work. They are also monitoring the site each year and have already provided valuable feedback on where additional dams would help. The total investment will be £89,000 over a period of six years.

The works are well underway and the positive change is already evident. Numerous dams have been installed and are holding water well, large parts of the bog surface have been cleared of scrub and trees and, for the first time in many years, sheep have been grazing the site. The remaining capital works will be completed over the coming year. As the entire site is now being managed under the bog scheme, the features are considered to be recovering.

Mr Reilly, one of the scheme participants commented: "We were quite sceptical at first about how effective the dams would be. Our neighbour installed dams on his part of the bog last year and once we saw how well they were working we were happy to join the scheme. Installing the dams was quite easy once we had got a ladder in place to drive in the big two-metre sections of piling."

Case Study 11

Moffat Hills Special Area of Conservation (SAC), Dumfries & Galloway/Scottish Borders



©Lorne Gill/SNH

Blackhope Glen - Moffat hills

Moffat Hills is notified as a nationally protected place (SSSI) for its geological and biological features, including upland habitats some of which are also internationally recognised (SAC) including alpine and subalpine heaths, blanket bog, and acid grassland. The Moffat Hills is also a popular recreation area, enjoyed by many walkers .

The upland features of the site are in unfavourable condition due to excessive grazing, trampling, and intensive burning. Several owners on this site are working to improve the condition of the features on the Moffat Hills.

Under a Scottish Rural Development Programme (SRDP) contract John Barker, one of the land managers, will carry out habitat management on 1100 hectares to bring the site into favourable condition. Sheep grazing management will benefit upland habitats and allow a range of rare plant species and birds such as curlew, black grouse, ringed ouzel and stonechats to thrive.

The area being managed makes up about 80% of the Mr Barker's farm and 40% of the protected place. Management will include a moorland grazing plan which will take over 1200 sheep off these habitats during the winter. The expected reduction in the damage done by stock during the winter should enable the recovery of the upland habitats. Around 60ha of bracken will also be eradicated, creating new space for the habitats to spread into. The winter of 2010/11 will be the first year of this five year plan and so improvement in habitats has yet to begin. Total value of the SRDP grant is approximately £100k.

Landowner, John Barker, said: "This proposal is a win win situation for me. Having less sheep on the hill for the winter months will reduce the grazing pressure on the habitats allowing them the opportunity to recover. It will also be a great benefit to me as farmer, particularly if we have another winter like the one we've just had where grazing is limited due to the prolonged periods of snow cover. Clearing the bracken will also help when gathering sheep at the back end of the season and will also have benefits for surrounding habitats."

On another part of the site, at Grey Mare's Tail and White Coomb, the National Trust for Scotland, is restoring vegetation on rockier areas with assistance from Scottish Natural Heritage. The tall herbs and ferns in these areas are now showing signs of recovery after years of overgrazing.

Case study 12

Moorfoot Hills Site of Special Scientific Interest (SSSI), Scottish Borders



©SNH

Moorfoot Hills - Blackhope Farm

The Blackhope and Garvald area at Moorfoot, south of Edinburgh comprises c1800 ha of upland farm. About 1250 ha is within the Moorfoot Hills SSSI which is protected nationally and internationally for its upland habitat, golden plover and upland breeding birds. The farm is one of the best places in the Borders for upland birds such as curlew, lapwing and black grouse.

However, years of overgrazing by sheep and bracken expansion has damaged the heather and resulted in suppressed and fragmented heather and an increase in the area of rough grassland. This has come about particularly on favoured sunny areas of the blanket bog and the well drained steeper slopes where unsympathetic muirburn (not carried out by the farmer) has also been a complicating factor.

The aim is to improve the heather moorland and its condition in terms of its extent, species diversity, structure and function. To assist in this, under a Natural Care Agreement with SNH, and subsequently a Rural Development Contract, the local farmer has reduced the sheep flock by 52%, carried out some off-wintering of stock and improved grazing control through extra shepherding and fencing.

The Scottish Rural Development Programme (SRDP) contract for £264,620 over a seven year period will take over from the Natural Care agreement by 2011 to continue these improvements within the SSSI. The SRDP also helps maintain the upland breeding bird population on in-bye too. And it supports other upland habitats, such a species-rich grassland, and helps protect the River Tweed SAC for otter, lamprey, salmon and water crowfoot.

Case study 13

Mingulay and Berneray Special Protection Area (SPA)



© Tracey Begg/SNH

Mingulay Dun - Mingulay looking SW

This protected area is made up of two islands and a section of the surrounding sea at the south of the Outer Hebrides. It extends to 7,801 hectares and the land is owned by the National Trust for Scotland (NTS). The site is recognised internationally for its breeding seabirds, including fulmar, guillemot, kittiwake, puffin, razorbill and shag. It includes the largest razorbill colony in Europe, with a single cliff face holding some 5000 birds. Bird counts in recent years have highlighted significant declines in numbers of guillemot, kittiwake, razorbill, shag and puffin.

The reason for these declines is unknown but may be associated with a reduction in food supply, particularly sandeels, which are an important part of the diet of many seabirds. Evidence from elsewhere in Scotland shows that availability of prey may be affected by warming sea temperatures and by fishing pressure. Breeding seabirds are only present at the colony for a short period each year and even then obtain their food at some distance out to sea. Management must therefore include measures in the wider sea as well as at the colony. Measures on land are restricted to visitor management, prevention of the introduction of land predators (cats, rats, mink etc) and continual monitoring but even though these aspects have been addressed, they alone will do little to reverse the decline in Mingulay's seabirds if the wider problem of food supply is not resolved

Dr Richard Luxmoore (Senior Nature Conservation Adviser for NTS) said "Seabirds can act as a barometer for the health of Scotland's seas. For this reason, we take monitoring of our seabird colonies very seriously and are about to embark on a 3-year research programme to improve the monitoring techniques.". It is hoped that this and similar investigations elsewhere will help identify exactly what is going wrong away from the breeding cliffs and enable corrective measures to be taken.

Case Study 14

Glenmore Forest Site of Special Scientific Interest (SSSI), Badenoch and Strathspey



©Colin Leslie/FCS

Pine regeneration on site where Sitka Spruce was removed



©Colin Leslie/FCS

Capercaillie within Glenmore

Glenmore forest in Strathspey is internationally important for Caledonian pine woodland. It also supports significant populations of capercaillie, Scottish crossbill and narrow-headed wood-ant. FCS owns the site and manages it as part of the national forest estate. In the early 1990s, the native pine woodlands were deteriorating due to pressure from the planted trees out-competing the native species. Some of the most visible effects of this was a decline in the capercaillie population and the decline of old pine trees.

Since then, more than £250,000 has been invested in a long term project to restore the woodlands. SNH, Cairngorms National Park Authority and volunteers have supported FCS in the initiative, and Scottish Government, British Petroleum and The Heritage Lottery Fund have provided the money. Work has included the removal of non-native trees and preventing their regeneration. Scots pine is actively managed to promote a more uneven age structure. And deer fencing has been removed linked to improved deer management and targeted pest control.

As a result of all the work at Glenmore, around 1,000 hectares of Caledonian pinewoods are recovering. There has also been a significant rise in the number of capercaillie living in the forest, due to above the national average breeding productivity in most years.

David Jardine, forest district manager for FCS, said: “Ever since the Rio World Summit when the importance of the Native Pinewoods of Scotland was re-affirmed an ambitious programme to restore them was started at Glenmore, and other important locations in the Highlands. Important early progress has been made and conditions for expansion of the pinewoods, and the iconic species which depend upon them, are now in place. However, given the longevity of the individual trees (many over 300 years), all those involved recognise that there is still a lot of work to do for these important sites.”

Case Study 15

Foulden Burn Site of Special Scientific Interest (SSSI), Scottish Borders



©Eleanor Stafford/SNH

Foulden Burn

Foulden Burn in east Berwickshire is nationally important for its geological and biological features, including species rich lowland grassland.

Until recently the grassland features were in unfavourable condition due to years of little active management. This led to a gradual increase in scrub and rank vegetation.

Over recent years, SNH has been working with both, the previous and current owners of the site, through the East Scotland Grassland Management Scheme (ESGMS), to bring the site into favourable condition. The work includes felling scrub, controlling weed species and introducing grazing onto the site. SNH is providing the £22,661 funding over the five years of the scheme, but the owners have carried out all the practical conservation work.

The works, which have been underway for a number of years, have markedly reduced the scrub and allowed the grassland to re-establish. This year has seen the re-introduction of grazing for the first time in a number of years, following problems with obtaining stock. As the whole site is now being managed under the grassland scheme the features are considered to be recovering.

Case Study 16

Loch of Strathbeg Site of Special Scientific Interest (SSSI), Banff & Buchan



© Dominic Funnell/RSPB

Scrub Clearance on marsh land



© Ruth McKee/RSPB

Geese at loch of Strathbeg

Loch of Strathbeg is an internationally important site for wintering wildfowl; a stop-off point as birds migrate south from breeding areas in northern Europe. Species include whooper swan, greylag and pinkfooted geese, pochard, tufted duck, wigeon, goldeneye and goosander.

The loch is the largest waterbody in the lowlands of North-east Scotland and is the largest dune loch in Britain. It is shallow and naturally rich in nutrients. The shores support freshwater marshes, reed beds and alder/willow carr. These habitats support a diverse range of flowering plants, including the lesser butterfly orchid, which has suffered a 33% decline in the UK since the 1960s.

Recent monitoring revealed an overload of nitrogen, phosphates and silt in run-off from fields in the catchment, particularly during storm flows. This clouded the water, blocking sunlight from aquatic plants, and making the loch more susceptible to algal blooms in summer.

Meanwhile a lack of grazing was encouraging scrub to spread and vegetation to become rank over some of the marshland. This reduced the diversity of plants and threatened some of the rarer species.

Since 2006 the Royal Society for the Protection of Birds (RSPB), Scottish Environment Protection Agency (SEPA) and Scottish Natural Heritage (SNH) have been working together to improve the site. They breached 19th century embankments, which had forced the burn into fast flowing straight channels. They installed a silt trap and reed-bed to slow water flow and intercept silt and nutrients before they reached the loch. The organisations also cleared 26 hectares of scrub from the marshland, and reintroduced grazing.

The work cost around £905,000. SNH contributed £150k and RSPB £100k. European Structural Funds Programme contributed £325k, while £275k came from the Heritage Lottery Fund and £55k from the Scotland Rural Development Programme. SRDP, SEPA and RSPB continue to meet the ongoing management and monitoring costs.

Dominic Funnell, RSPB's Reserve Manager at Loch of Strathbeg commented: "There have been many technical issues to be solved during the planning and delivery phases of this project but the early results are hugely positive with the re-establishment of key species such as lesser butterfly orchid in the newly restored marshland and indications that levels of silt entering the Loch are being reduced. Whilst there are still challenges ahead we are well on track to achieving our goal of restoring this fabulous wetland back to its former glory."