



nature's voice

“BRINGING LIFE BACK TO THE BOGS”



A new beginning for Scotland's
majestic Flow Country

A special place...

“ I’m Norrie Russell,
senior site manager at Forsinard Flows nature
reserve, and I love this place.

Here, the ground quivers when you walk on it –
a rich carpet of moss covering deep peat below.

In spring, there are dunlins, golden plovers,
greenshanks and golden eagles. Magnificent
red deer graze. In autumn, the bog plants flush
red and chestnut brown – breathtaking.

Forsinard Flows lies at the heart of the biggest
area of West Atlantic blanket bog in the world,
an area saved from near total destruction thanks
to the efforts of the RSPB and its supporters.

It is essential that we protect this place,
and restore it, because **it’s one of the
most important places for wildlife
in the world.** ”

**Norrie Russell, Senior Site Manager,
Forsinard Flows nature reserve**

The Flow
Country holds
over 10% of the
UK’s blanket bog,
and almost 5%
of the global
resource.

If you've never been lucky enough to visit Scotland's ancient **Flow Country**, get ready to discover somewhere truly magical.

The Flow Country is the common name for the **vast peatland blankets** of Caithness and Sutherland – mainland Scotland's most northern counties. This amazing place is home to the largest blanket bog in the world, **covering over 400,000 hectares** (1,500 square miles) – three times the size of the Shetland Islands.

Peat has been forming here for thousands of years and can reach an incredible five metres in depth. The dead remains of bog mosses and other plants are preserved in wet, acidic conditions, creating a unique landscape that plays a **vital role in the battle against climate change**.

Over 400 million tonnes of carbon are stored beneath the surface, protected by a fragile layer of moss that stops it escaping into the atmosphere – acting almost as the lungs of our planet.

The spectacular terrain is dotted with **patterned pools and lochs** that shimmer like natural mirrors beneath the bright sunlight. **Majestic mountains** rise to the west, and the area is drained by a network of **stunning river systems** that flow to Scotland's north and east coasts.

But despite being recently proposed as a potential **World Heritage Site**, the Flow Country is in trouble – and it still needs our help.

Where is the Flow Country?

The dark green shading shows Caithness and Sutherland's vast areas of blanket bog, with RSPB Forsinard Flows lying right at the heart of it.



Forsinard Flows

What lives here?

It isn't just peat that flourishes in the Flow Country – the area also provides a stronghold for special wildlife.

The mix of peatland and wetland creates habitats of national and international importance, providing homes for a wide range of magnificent wildlife. Otters and water voles flourish in the wetlands, while Atlantic salmon and freshwater pearl mussels occupy the rivers.



Mountain hare

The mountain hare shows off its white coat during the winter months.



Merlin

Merlins and hen harriers hunt over bog and moorland, and along river corridors in the summer.

Red deer roar across the dramatic chestnut-coloured grass in September and October.



Red deer

The carnivorous sundew plant feeds on insects and lives for up to 50 years.



Sundew



Otter

Greenshank



Common scoter



Golden plover



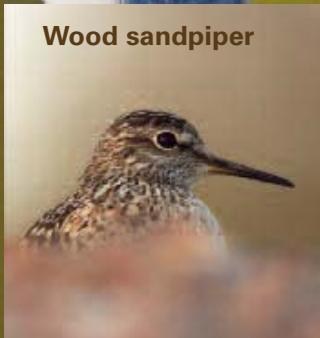
Dunlin



Red-throated diver



Wood sandpiper



Short-eared owl



This beautiful place is home to many birds of European importance, including some of the continent's highest densities of wading birds.

Birds of European importance found in the Flow Country

Species	No. of pairs ³	% GB breeding population
Black-throated diver¹	26	16
Golden eagle¹	5	1
Golden plover¹	1,064	5
Hen harrier¹	14	3
Merlin¹	54	4
Red-throated diver¹	89	9
Short-eared owl¹	30	3
Wood sandpiper¹	5	50
Common scoter²	27	37
Dunlin²	1,860	19
Greenshank²	256	17
Wigeon²	43	9

¹The site supports populations of species of European importance listed on Annex 1 of the EC Birds Directive.

²The site supports populations of European importance of migratory species.

³Number of pairs estimated in early to mid 1990s

A natural asset

Peatlands don't just house some of our most valuable wildlife, they also perform an invaluable climate-regulating service, extracting vast amounts of carbon from the atmosphere and storing it in the soil.

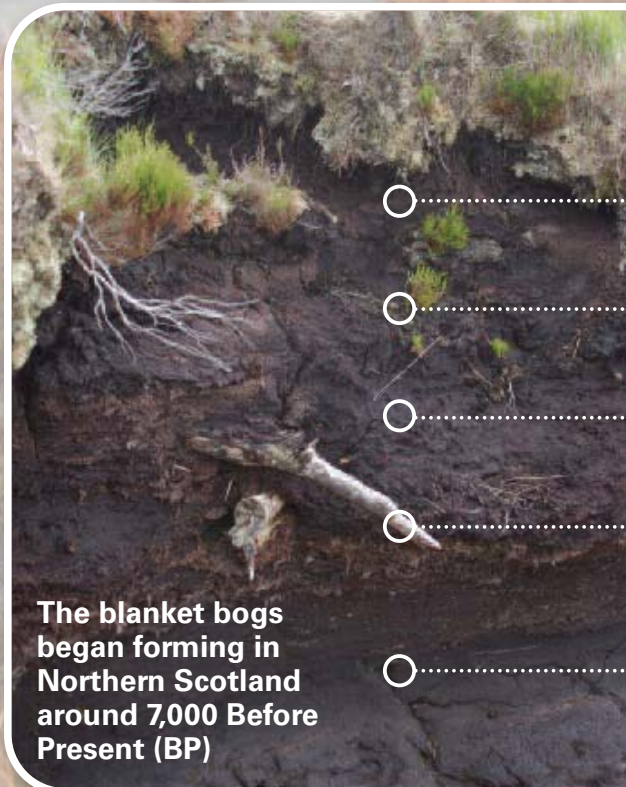
The Caithness and Sutherland peatlands store an estimated 407 million tonnes of carbon – over double the amount in all of the UK's forests.

Losing just 4% of that stored carbon, through damage to the peatlands, would equal Scotland's total household and industrial carbon emissions.

History lesson

The peat itself can also act as a massive history book. By taking a peek beneath the surface, we get an insight into what plants grew in each millennia, a detailed timeline of geographical events, and discover the huge impact of human activity on the area.

7,000-year-old hazelnuts



The blanket bogs began forming in Northern Scotland around 7,000 Before Present (BP)

Here are just some of the amazing things that have been found preserved in the peat...

- Particles from car exhausts in the 20th century
- A Celtic war horn from the 1st century
- Volcanic ash from an Icelandic eruption in 4,300 BP
- Ancient tree remains from 4,500 BP – a brief period in time when trees grew naturally in the Flow Country
- Hazelnuts found right at the bottom of the peat are around 7,000 years old

“ Forsinard is a truly wonderful place. The bog bean is spectacular, with its white and pink froth of flowers studding thousands of bog pools. ”

Norrie Russell

Senior Site Manager, Forsinard Flows nature reserve



Changing times...

For thousands of years, the Flow Country was left virtually unspoilt. Throughout this time the peatland remained largely free of trees, with small natural woodlands confined to straths, burn sides and slopes.

Increased livestock numbers (especially sheep) and the establishment of major sporting estates during the last 250 years resulted in gradual change, before **decisions made in the 20th century changed the landscape beyond all recognition.**

What's changed?

After remaining largely untouched for millennia, the Flow Country has undergone a massive change in land-use over the last 60 years.

Throughout the area, the blanket bog has been drained in an attempt to make the land more productive. In addition, during the 1970s and '80s, tens of thousands of hectares of blanket bog were planted with non-native conifer trees, driven by inappropriate forestry grants and tax breaks.

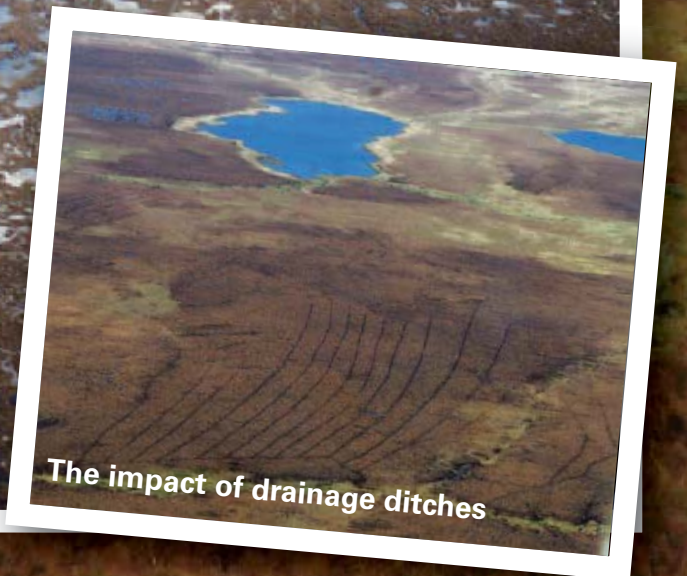
Huge areas of blanket bog habitat have consequently been lost, with a devastating impact on wildlife and the vast carbon store.



Freshly ploughed bog ready to be planted



Huge plantations of non-native conifers now dominate the Flow Country's landscape



The impact of drainage ditches

“ In the 1980s, vast areas of the unique Flow Country habitat were destroyed. The land had been drained and commercial conifer plantations established, despite being naturally treeless for over 4,000 years. The unfortunate result was huge damage to the habitat and the disappearance of much of the special wildlife. ”

Dr Pete Mayhew

RSPB Senior Conservation
Manager, North Scotland



Dunlin

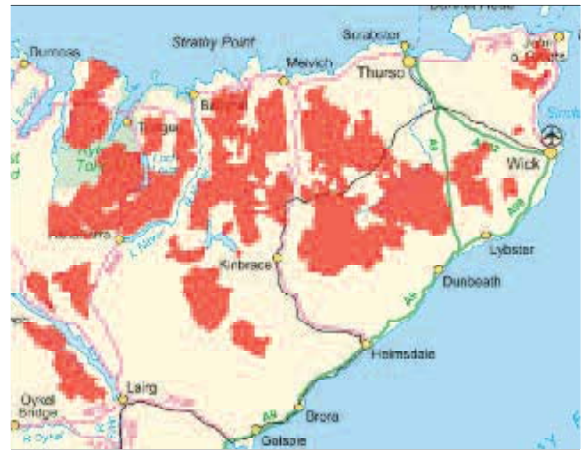
Impact of planting trees on bogs

- The bog surface is drained to lower the water table, drying out the surrounding peat.
- As conifers become established, the dense canopy closes and shades out bog plants.
- The roots penetrate the peat, which gradually dries out, shrinks and oxidises.
- This leads to a significant loss of carbon to the atmosphere and water courses, which threatens the massive carbon store in the remaining peat.
- Carbon losses have a negative impact on water quality and national efforts to reduce greenhouse gas emissions.
- The drainage system increases the speed of flow to streams and causes increased flood peaks.
- Planting trees close to neighbouring bogs dries them out too.
- Birds like golden plovers, dunlins and red grouse seriously decline within at least 800 metres of forest edges.

Taking a stand

In 1988, following a major campaign led by RSPB Scotland and the Nature Conservancy Council, a network of Sites of Special Scientific Interest (SSSIs) was established to protect the Flow Country.

Tax breaks were removed later that year, effectively ending landscape-scale planting. Most of the key areas are now protected as the Caithness and Sutherland Peatlands Special Area of Conservation (SAC) (144,000 ha) and Special Protection Area (SPA) (146,000 ha).



Map showing areas of the Flow Country now protected by the Caithness and Sutherland Peatlands SAC and SPA

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Bringing life back to the bogs – a new beginning

This is just some of the amazing work that has already been done in the Flow Country.

1992

The Peatland Management Scheme is launched, making direct payments to land-owners and occupiers to support maintenance activities in the SSSIs.

1994

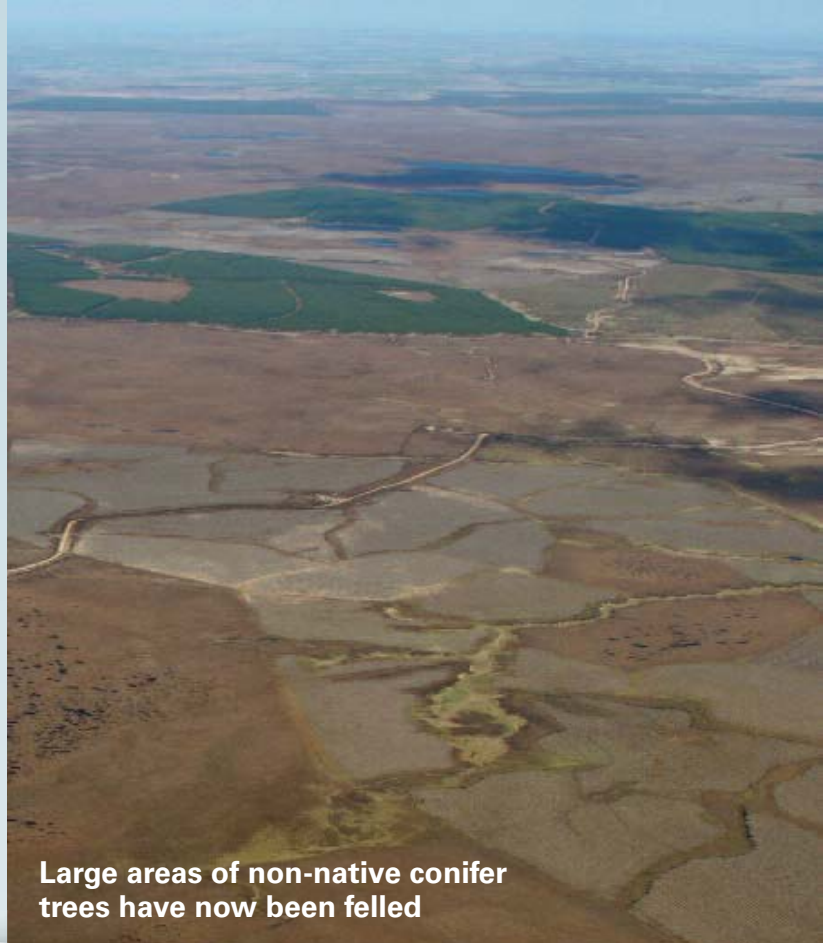
RSPB Scotland, Scottish Natural Heritage and Caithness & Sutherland Enterprise receive 50% co-funding from the EU Life Nature Programme to improve awareness, and the nature conservation status of the blanket bog. The project raises awareness of the importance of peatlands, supports positive land-management activities and trials habitat restoration techniques.

We've blocked drains and removed thousands of trees



“ RSPB Scotland successfully fought to halt the tree planting and has since started restoring the natural hydrology. The wildlife is now returning, and the Flows is the only wildlife site, from 38 in the UK, proposed as a World Heritage Site. ”

Stuart Housden
Director RSPB Scotland



Large areas of non-native conifer trees have now been felled



Around 28,000 acres of RSPB Forsinard Flows nature reserve was designated as a National Nature Reserve by Scottish Natural Heritage in 2007

1995

The RSPB acquires Forsinard Estate in the heart of the Flow Country, thanks to a major contribution from RSPB members and supporters. The new nature reserve is run by locally-based staff and heralds the start of a more progressive conservation approach.

2001

A partnership of RSPB Scotland, Scottish Natural Heritage, the Forestry Commission and Plantlife begins a £2.8 million project, funded by EU Life Nature, that brings conservationists and foresters together to restore damaged blanket bog at a landscape scale.

2011...

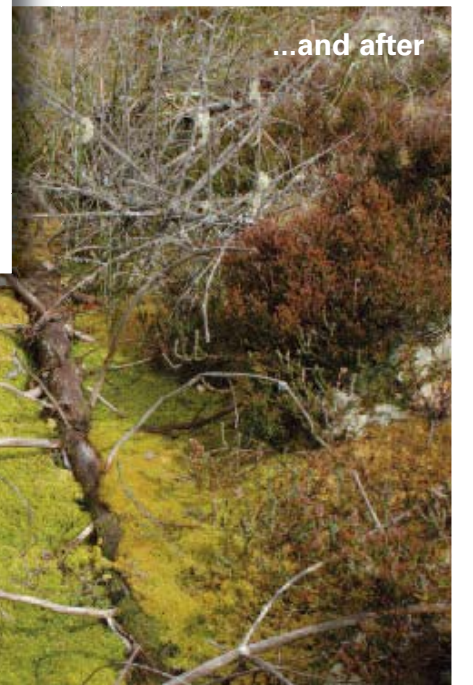
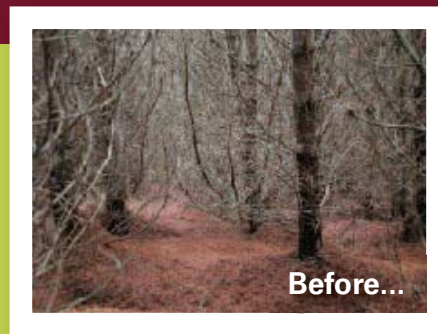
We have continued restoring forest to bog and blocking drains since the end of the second Life project, using a range of funding sources. In time, the important populations of breeding birds and other wildlife will return.

Major achievements

1 Drains have now been blocked across 15,600 hectares of blanket bog, using over 13,000 dams.

2 Trees have been removed from 2,200 hectares of former blanket bog, making this one of the largest peatland restoration projects in the UK.

3 Since buying Forsinard Estate in 1995, followed by Dorrery Estate, the Blar nam Faoileag and a number of forestry blocks, the RSPB's Forsinard Flows nature reserve has grown to 21,500 hectares, making it **the Society's largest single UK land-holding.**



4 Where we have removed trees, **the former bog surface is re-vegetating** and the old forestry furrows are filling up with mosses and plants, helping to raise water levels and create new peat.

5 Forsinard Flows attracts **over 4,000 visitors each year, who contribute £190,000** to the local economy.



so far



6 We work closely with our crofting and farming partners, and neighbouring sporting estates, to **manage grazing, trout angling and red deer populations** for the benefit of the local economy.

7 We have re-wetted drained peatland, allowing bog mosses and other vegetation to recover. This has **attracted wading birds** like golden plovers, dunlins and greenshanks.

Meadow pipit



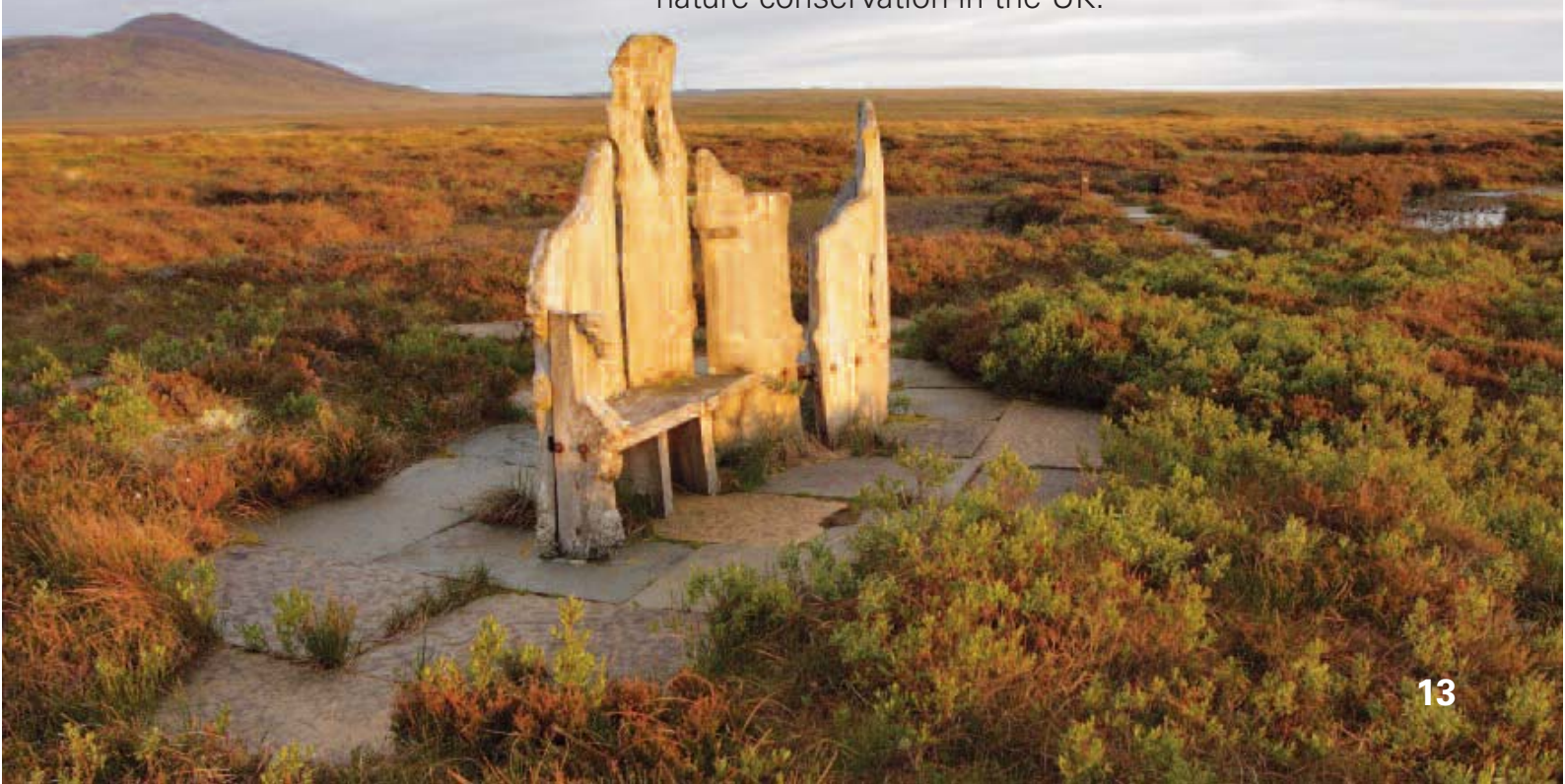
8 Our ongoing work has **generated considerable local employment**. The reserve supports 16 full-time equivalent jobs, with much work undertaken by volunteers.

9 **Breeding birds** like hen harriers, short-eared owls and meadow pipits are returning to areas recently covered by trees.

Red deer



10 In 2007, a large section of Forsinard Flows was designated as **The Flows National Nature Reserve** in recognition of its outstanding importance to nature conservation in the UK.



Research centre

Forsinard Flows reserve is now emerging as a major centre for research on peatland ecology, hydrology and carbon.



We are working with a wide range of research partners, including the Centre for Ecology & Hydrology (CEH), the James Hutton Institute (JHI), Thurso's Environmental Research Institute (University of the Highlands & Islands), St Andrews and Stirling Universities, and we support a range of ongoing research projects.

At Forsinard, CEH are researching the impact of drainage and drain blocking on carbon fluxes as part of their Carbon Catchments Initiative, including a state-of-the-art automated greenhouse gas flux tower. St Andrews and Stirling Universities and the JHI are studying carbon dynamics of restoring forestry to bog.

Further research is now required to quantify the benefits of peatland restoration in meeting international climate change targets.

RSPB Scotland has been monitoring bird populations in the wider Flows area for over 20 years, and annually at Forsinard reserve since 1995. Key bird species have maintained healthy populations on the intact bogs away from forest blocks, but **research has shown significant declines of golden plovers and dunlins** in an 800-metre band around the plantations.

Bog habitat conditions are monitored by hundreds of transects and quadrats, which record sphagnum moss, health indicators and deer indices. **Water tables are monitored** in areas where we are restoring the bog. We monitor some wildlife species annually, including black-throated divers, common scoters, hen harriers, merlins and deer.

In 2010, the Scottish Government contributed £200,000 for the RSPB and SNH to carry out research on peatland restoration, particularly in the Flow Country. This is intended to improve our understanding of the benefits of restoration for carbon and wildlife.

◀ **A researcher monitors greenhouse gas fluxes on the peatland**



An innovative way forward

In 2005, Scottish Natural Heritage published a management strategy for the Peatlands of Caithness and Sutherland. This was the start of an ecosystem-based approach designed to look beyond the designated sites.

By tackling issues at a landscape scale, the new strategy aims to cover the full ecological function of the peatlands and resolve different land-use pressures. For example, by identifying areas where trees could be planted, as well as areas for removal, it should be possible to create a sustainable forestry future in the area.

This is a shared strategy across land managers, crofters, foresters and conservation interests.



“ The deep peat soil on the reserve holds a hugely significant stock of stored carbon. We need to work together to remove trees from deep peat areas, then restore these areas and secure the valuable carbon stocks as a key part of our fight against climate change. ”

Norrie Russell

Site Manager, Forsinard Flows nature reserve

The Peatlands of Caithness & Sutherland

Management Strategy 2005-2015

Objectives:

- To promote and carry out land management that benefits nationally and internationally important areas of peatland, and associated habitats and species
- To promote and undertake sustainable woodland management, with an appropriate balance between woodlands and peatlands
- To encourage community and economic development that is compatible with safeguarding those features that make the peatlands important
- To promote greater awareness, understanding and enjoyment of the special wildlife, landscape, historical and cultural value of the peatlands.

Five pairs of wood sandpipers breed in the Flow Country every year – that's almost half of the UK's breeding population



The future

Despite the huge amount of work that has already been done in the Flow Country, there is still so much more to achieve.

We've identified a need to **target resources at blocking the network of drains** that are evident across most of the Flow Country.

We still need to remove thousands of trees to improve the overall state of the peatlands for wildlife, safeguard the underlying carbon

store and re-create the wide expanse of open peatland that is such a characteristic feature of the area.

This is an important part of the RSPB's Futurescapes programme and is a flagship example of how large-scale projects can deliver multiple benefits for nature.

There is global recognition that peatlands are a conservation priority for biodiversity, tackling climate change and securing important services, such as clean water and economic opportunities through tourism.

“ The Flow Country is a global example of positive action tackling past damage to biodiversity and other peatland ecosystem services, and highlights the huge benefits of successful partnerships working together with the right funding. ”

Clifton Bain

Director IUCN-UK Committee Peatland Programme

“ Will you **step up for nature** with us? ”

There is still an enormous amount of work to be done and we need your help.

There is now an urgent need to prioritise the future removal of trees for blanket bog restoration.

We must act now by restructuring the forests to restore the ecology of blanket bogs, so we can safeguard the remaining peat and carbon stocks.

Many of the **forest blocks** have grown to a height where they are susceptible to wind damage, so it is vital the trees are cleared before they start to blow down.

While we seek to continue to acquire and remove key blocks of forestry, **further biodiversity and carbon gains may be achieved through reaching agreement on the future re-stocking of currently afforested areas.**

Our work to restore damaged blanket bog and to understand the costs and benefits of restoring the ecosystem for biodiversity, carbon and water is of international importance.

We now urgently need to work together to raise funding and implement the jointly-agreed Management Strategy, so we can deliver a more sustainable future for the peatlands of Caithness and Sutherland.

It is absolutely vital that we secure this truly special place and its wildlife for future generations.



**STEPPING UP
FOR NATURE** ✓

Get involved

To find out how you can help us save this amazing place visit www.rspb.org.uk/supporting/campaigns/flowcountry



We gratefully acknowledge support from
RSPB members and supporters
(Appeals, Flow Country partners),
EU Life Nature Fund,
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RSPB Scotland is part of the RSPB, which speaks out for birds and wildlife, tackling the problems that threaten our environment. Nature is amazing – help us keep it that way.

Cover photo: Black-throated diver by Danny Green (rspb-images.com)
Back cover photo: Melvich School on a visit to Forsinard Flows nature reserve by Norrie Russell (RSPB).
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