

**RSPB**

# **Acquisition and management of Forsinain & Dyke Forest Blocks**



**PROJECT BUSINESS PLAN**

**Nov 2009**

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Appendix 1: Project site maps

## 1. Project Summary

RSPB plan to acquire and restore 1,705 ha of the Forestry Commission Scotland (FCS) Forsinain and Dyke plantations back to open blanket bog and associated habitats. This will include removal of 1,150 ha of non-native conifer woodland, continued restoration management of 225ha of trees previously felled by FCS and management of enclosed unplanted blanket bog and bog pools(296ha), loch(4ha) and riverside grassland(approx 30ha). This will be a continuation of our restoration work on our Forsinard Flows Nature Reserve, which concentrates on returning similar recent forestry plantings back to open blanket bog, with over 1,900 ha having been completed since 1997. The areas proposed for RSPB acquisition score highly for restoration when assessed by criteria developed by RSPB and others based on deep peat soils, low slope, proximity to EU designated Natura sites, National Nature Reserve and important bird populations. The other half of Forsinain not included in the proposal lies on steeper slopes with better soils, lower wind-throw hazard classification and better road and track access and it is hoped that the North Sutherland Community Forestry Trust (NSCFT) will acquire and manage this area.

The Forsinain and Dyke plantations lie adjacent to the Forsinard Flows Nature Reserve and additional areas of globally rare blanket bog designated as Sites of Special Scientific Interest (SSSI), the Peatlands of Caithness & Sutherland Special Protection Area (SPA), Special Area for Conservation (SAC) and Ramsar site. Forsinard Flows is the largest RSPB nature reserve in the UK with 15,989 ha under RSPB ownership, which contains The Flows National Nature Reserve managed on behalf of SNH. The combined reserve area covers 15% of the Peatlands Natura site, which equates to almost 2% of all blanket bog habitat in the UK.

All of the open peatland SSSI's adjacent to these two forest blocks are currently in unfavourable condition for bird interest as assessed by SNH's Site Condition Monitoring. Both the species that have declined to cause this situation (Dunlin and Golden Plover) have been shown to suffer from decreased populations adjacent to forestry, along with other species such as Red Grouse and Skylark.

Forsinard Flows reserve supports populations of 6 UKBAP bird, 5 UKBAP mammal species and also 25 LBAP species and will therefore also contribute to rural priority HIG08 of the Scottish Government Rural Development Programme. This work will also contribute towards HIG9 by removing damaging effects from designated sites and Rural Priority HIG10 with populations of 4 Species action framework species (wildcat, water vole, red & roe deer). The extensiveness of this site will also contribute to Rural Priority HIG12 by maintaining connectivity of riparian habitat & peatlands in Caithness & Sutherland. As these sites contain massive stores of carbon in their peat soils, the restoration work will also contribute to help mitigate changes to climate under HIG22 and HIG23 to protect the soil carbon. The peat soils here support a massive carbon store estimated to contain 20 to 40 times more carbon per hectare than the current tree crop.

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Proposed works will contribute significantly to UK Biodiversity Action Plan targets for blanket bog, hen harrier and water vole as well as other species for action such as wildcat and otter.

Restoration work will concentrate on a phased removal of the tree crop using methods trialled extensively on the Reserve, plus development of new working practices to extract timber from the more accessible, and better-grown sections of the tree crop. Drain damming and management of the revegetation of the furrows will restore the all important bog hydrology. Other bog vegetation will be gradually restored, and sphagnum moss in particular. Deer and stock fencing will be managed to protect remaining woodlands and to manage grazing levels by deer and stock as part of restoration works. Tree seedlings and any stump regrowth will be controlled to prevent re-colonisation again using techniques developed at Forsinard.

RSPB Scotland will work closely with the local community to maximise the local employment, social, economic and environmental benefits whilst achieving key restoration objectives. In particular, we will work closely with the NSCFT who have existing local timber processing facilities at Forsinain and who hope to acquire other parts of these blocks. We will also seek to supply lower grade timber to the emerging woodfuel and biomass plants in the area. It is estimated that the restoration works will directly create 6 to 9 contract jobs including skilled machinery operator jobs for 5 - 10 years. A full time warden will be employed to aid existing reserve staff to deliver the works. Long-term employment will be created through ongoing management of deer, grazing, tourism and the conservation interest.

We will further develop the public access, enjoyment and understanding of these areas including on site work on the interpretation of Forsinain Trail, at the Forsinard Flows Visitor Centre and through our reserve schools education programme. We will also maintain and develop engagement with the public, RSPB members, key local stakeholders and promote life long learning.

## **2. Project Aims and Objectives**

The Forsinain and Dyke project and its aims and objectives are embodied within the wider aims and objectives of the Forsinard Flows Nature Reserve Management Plan 2007 to 2012, which are listed below along with some background for context.

### **2.1 Main Forsinard Flows Nature Reserve Aims**

The main aims of RSPB management across the reserve are:

- To maintain the blanket bog and wet heath and where possible enhance the blanket bog habitat and the associated nationally important flora and fauna including key birds such as golden plover, dunlin, greenshank, hen harrier, merlin and short-eared owl
- To maintain the internationally important aquatic systems and enhance the integrity of the aquatic systems, including loch water levels, water quality and the key species of waterfowl (black & red-throated diver, common scoter, wigeon and teal)
- To maintain the in-bye ground and areas of grassland principally for the benefit of feeding and breeding waders (particularly golden plover, dunlin, lapwing and curlew and other key farmland birds (including twite, reed bunting and skylark)
- To maintain montane and dry heath habitat for botanical interest and breeding hen harrier, merlin, short-eared owl, waders and nationally scarce *Arctostaphylos alpinus*
- To maintain and enhance the native broad-leaved woodland (predominantly birch and hazel) eg in Dirlot Gorge SSSI
- To undertake a programme of research/survey/monitoring to inform future management
- To raise awareness and encourage access and enjoyment on the reserve and surrounding peatlands

### **2.2 Context – Natural Heritage**

The dominant interest on the Forsinard & Strathmore Flows Nature Reserve is its extensive blanket bog and associated upland moorland habitats and species. Consequently, all of the reserve's key aims and objectives as laid out in the five year management plan (2007-2012) apply in some way to the blocks of land covered by this Project Plan.

Forsinard & Strathmore Flows Nature Reserve lies at the heart of the 400,000 ha of peatlands in Caithness and Sutherland (known as 'The Flow Country'). This vast area is internationally recognised for the quality and extent of blanket bog habitats equating to 4% of the global peatland resource - this is the largest wetland in the UK. The nature reserve supports significant populations of breeding birds in a UK

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context: 1.6% of red-throated diver; 2.4% of black-throated divers; 16% of common scoter; 1% of dunlin (race *schinzii*); 0.3% of golden plover; 4.4% of greenshank; and 0.5% each of merlin, hen harrier and short-eared owl

Significant areas of the peatlands have been designated as Sites of Special Scientific Interest (SSSI) and collectively form the Peatlands of Caithness & Sutherland Special Protection Area (SPA), Special Area for Conservation (SAC) and Ramsar site. Collectively, Forsinard Flows is the largest RSPB nature reserve in the UK with 15,989 ha under RSPB ownership, which contains the Flows National Nature Reserve, plus 2005 ha of Strathmore Estate managed in partnership with John Thurso MP. The combined reserve area covers 15% of the SAC and SPA designated sites, which equates to almost 2% of all blanket bog habitat in the UK. The RSPB 25-year vision is to have 3% of the UK blanket bog resource under positive conservation management and all managed sections of designated sites to be in favourable condition.

Overall management of the Forsinard & Strathmore reserves will focus on: maintaining the pristine blanket bog habitat, restoring former blanket bog habitat through the removal of relevant areas of forestry plantation as proposed here, blocking drains, managing grazing levels by deer, sheep & cattle, and controlling muir-burning. This will, in turn, enhance breeding bird populations and other key conservation species. Managing the in-bye fields for feeding and breeding bog and farmland waders and waterfowl will benefit key breeding birds. Human disturbance is also an important factor; especially during the bird breeding season and it is important that ongoing fishing activity and developing public access is carefully managed in an integrated and sustainable manner.

The reserve is used to demonstrate multi-use land management to achieve linked conservation, sporting and agricultural objectives and thus positively influence peatland management throughout the north of Scotland. It will also be used as a demonstration site for restoration techniques and to promote research into blanket bog management, restoration, carbon dynamics and ecological services.

The continuing partnership between the RSPB, John Thurso MP, Scottish Natural Heritage, Forestry Commission Scotland, SEPA, neighbouring estates, tenants and University of the Highlands & Islands amongst others will enable positive conservation management. This will include, in particular, the maintenance of, or restoration to favourable SSSI, SAC and SPA condition and the undertaking of positive management over a large wetland area and compliance with the Water Framework Directive. The RSPB will continue to work closely with the local community and will contribute towards employment and tourism opportunities, with our work and aspirations being understood and supported.

As a high profile reserve within RSPB's network and as a nationally promoted NNR it will be a best practice visitor site playing a key role within the important tourism economy of the North Highlands. The reserve will continue to attract at least 5000 visitors per year and undertake a programme of guided walks and

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education work with local schools. The visitor centre will provide an insight for all visitors of the importance of the Flow Country and the nature trails will allow a quality 'Flows experience in microcosm'. Promotion to wider audiences will be through our membership, partnership working, media and website.

The Flows reserve supports populations of 6 UKBAP bird & 5 UKBAP mammal species and also 25 LBAP species and will therefore also contribute to rural priority HIG08 of the Scottish Government Rural Development Programme. This work will also contribute towards Rural Priority HIG10 with populations of 4 Species action framework species (wildcat, water vole, red & roe deer). Finally, the extensiveness of this site will also contribute to Rural Priority HIG12 by maintaining connectivity of riparian habitat & peatlands in Caithness & Sutherland.

As part of delivery of objectives we will continue the ongoing restoration of former important peatland habitat from forest plantation and through hydrological restoration on open peatland. On afforested areas we will fell trees, maintain tree free bog habitat, restore sound hydrological management for vegetation recovery, protection of carbon store, long term peat formation and maintain suitable levels of deer/stock to protect the natural succession of ground vegetation. This will restore rare habitat, protect adjacent habitat from negative edge effects, make these areas suitable for key breeding birds, and form a buffer between intact bog and the remaining plantations on neighbouring land.

### **2. 2.1 Key Features - Natural heritage**

The Key Features of conservation value on the reserve and their conservation status are listed below in Tables 2.1 to 2.6.

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<b>Table 2.1 Blanket bog &amp; wet heath</b>	
<b>Important feature</b>	<b>Why</b>
Blanket bog (Upland)	Notified feature at Ben Griams, Blar nam Faoileag, East Halladale, Knockfin Heights, Loch Caluim Flows, Rumsdale Peatlands, Sletill Peatlands, West Halladale, Forsinard Bogs <b>SSSI's</b> , qualifying feature on C&S Peatlands <b>RAMSAR</b> , qualifying feature C&S Peatlands <b>SAC</b> , <b>FD IV</b> RSPB priority habitat
Quaking bogs, ladder fen, transition mires Depressions on peat substrates and wet heathland with cross-leaved heath	Qualifying feature on C&S Peatlands <b>SAC</b> , high international importance, <b>FD IV</b> RSPB priority habitat
Breeding bird assemblage	Notified feature at Ben Griams, East Halladale, Knockfin Heights, Loch Caluim Flows, Rumsdale Peatlands, Sletill Peatlands, West Halladale and Forsinard Bogs <b>SSSI's</b> , qualifying feature on C&S Peatlands <b>RAMSAR</b>
Breeding skylark	UK BAP priority species, red list, <b>FD IV</b> RSPB priority species
Breeding short-eared owl	SPA qualifying feature, Amber list
Breeding greenshank	Notified feature at Ben Griams, East Halladale, Forsinard Bogs, Loch Caluim Flows & Sletill Peatlands <b>SSSI's</b> and qualifying feature on C&S Peatlands <b>SPA</b>
Breeding golden plover	Notified feature at Ben Griams, East Halladale, Forsinard Bogs, Loch Caluim Flows & Sletill Peatlands <b>SSSI's</b> and qualifying feature on C&S Peatlands <b>SPA</b>
Breeding dunlin	Notified feature at Loch Caluim Flows & Sletill Peatlands <b>SSSI's</b> , qualifying feature on C&S Peatlands <b>RAMSAR</b> and qualifying feature on C&S Peatlands <b>SPA</b>
Breeding curlew	Amber list
Breeding greylag goose	Qualifying feature on C&S Peatlands <b>RAMSAR</b> , amber list

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Breeding Artic skua	Blar nam Faoileag
Breeding Cuckoo	Newly added to <b>Red List</b> of BOCC
Adder <i>Vipera berus</i>	<b>Declining nationally</b>
Lesser butterfly orchid <i>Plantathera bifolia</i>	Species of Conservation Concern 'vulnerable' (2005)
Small cranberry <i>Vaccinium microcarpum</i> , Dwarf birch <i>Betula nana</i> ,	Characteristic species of undamaged and pristine blanket bog
Bog Orchid <i>Hammarbya paludosa</i>	Characteristic species of undamaged mesotrophic mire and fen
Bryophyte assemblage	Species of Conservation Concern listed (2000) Lindberg's bog-moss <i>sphagnum lindbergii</i> , olive bog-moss <i>sphagnum majus</i> , cleft bog-moss <i>sphagnum riparium</i> ; Austin's bog moss <i>Sphagnum austinii</i> , Rusty bog moss <i>Sphagnum fuscum</i> & Cow horn bog moss <i>Sphagnum subsecundum</i> Nationally Scarce species
Mammals	Wildcat <i>Felis sylvestris</i> , Declining, restricted range, <b>LBAP</b> priority species, Mountain hare <i>Lepus timidus</i> (Restricted range), Pine marten <i>Martes Martes</i> , <b>LBAP</b> priority species and water vole <i>Arvicola terrestris</i> , <b>FDIV</b> priority species
Dubh lochans	Highlighted as a feature of Blanket bog habitat

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**Table 2.2 Aquatic systems**

<b>Important feature</b>	<b>Why</b>
Oligotrophic lochs	Notified feature at Rumsdale and Forsinard Bogs <b>SSSI's</b>
Acid peat-stained lakes and ponds	Qualifying feature on C&S Peatlands <b>SAC</b>
Clear-water lochs with aquatic vegetation and poor to moderate nutrient levels	Qualifying feature on C&S Peatlands <b>SAC</b>
Breeding black-throated diver	Notified feature at West Halladale <b>SSSI's</b> and qualifying feature on C&S Peatlands <b>SAC</b> , amber list
Breeding red-throated diver	SPA qualifying feature (C&S Peatlands), amber list
Key breeding waterfowl	Scoter is <b>UK BAP</b> species, notified feature at, Forsinard Bogs, Sletill Peatlands, West Halladale qualifying feature on C&S Peatlands <b>SPA</b> and <b>FD IV</b> RSPB priority species, red list Wigeon is qualifying feature on C&S Peatlands <b>SPA</b>
Otter <i>Lutra lutra</i>	Qualifying feature on C&S Peatlands <b>SAC</b> , <b>UK BAP</b> priority species
Atlantic salmon, sea trout	Salmon is qualifying feature on River Thurso <b>SAC</b> . Sleach water
Brown trout, arctic char, eel	Brown trout have importance for fishing
Azure hawker <i>Aeshna caerulea</i>	Nationally notable species, Cat. B at Forsinard
<i>Nemotaulius punctatolineatus</i> Caddis fly	RDB2 at Forsinard
<i>Oreodytes alpinus</i> Beetle	Notified feature at Forsinard <b>SSSI's</b> and RDB3

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**Table 2.3 Montane habitat**

Important feature	Why
Alpine heath, montane cliff vegetation, tall herb ledge & inland rock	Notified feature at Ben Griams SSSI and <b>FD IV</b> RSPB priority habitat
Breeding bird assemblage	Notified feature at Ben Griams SSSI
Vascular plant assemblage	Notified feature at Ben Griams SSSI
Breeding peregrine	<b>FD IV</b> RSPB priority species, amber list
Breeding golden eagle	Qualifying feature on C&S Peatlands SPA, <b>FD IV</b> RSPB priority species, amber list
Breeding ptarmigan	<b>FD IV</b> RSPB priority species
Vascular plants	Juniper <i>Juniperus communis</i> sub sp. <i>nana</i> <b>UK BAP</b> species, Alpine bearberry <i>Arctostaphylos alpinus</i> <b>LBAP</b> priority species, Alpine mouse-ear <i>Cerastium alpinum</i> Species of Conservation Concern 'vulnerable' (2005), Pyramidal bugle <i>Ajuga pyramidalis</i> and Alpine cinquefoil <i>Potentilla crantzii</i> Restricted montane species
Mountain hare <i>Lepus timidus</i>	Restricted range, prey species of golden eagle

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**Table 2.4 Dry upland heathland**

Important feature	Why
Dry upland heathland	Important habitat for breeding raptors, <b>FD IV RSPB</b> priority habitat
Breeding merlin	Qualifying feature on C&S Peatlands <b>SPA, LBAP, FD IV RSPB</b> priority species, amber list
Breeding hen harrier	Qualifying feature on C&S Peatlands <b>SPA, FD IV RSPB</b> priority species, red list
Breeding short-eared owl	Qualifying feature on C&S Peatlands <b>SPA, LBAP, FD IV RSPB</b> priority species, amber list
Breeding red grouse	<b>FD IV RSPB</b> priority species, <b>LBAP</b> , amber list
Mountain hare <i>Lepus timidus</i>	Restricted range, prey species of golden eagle

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**Table 2.5 Breeding birds**

Species	Status	Comments
Common scoter	Ram, LBAP, UKBAP	Lochs, bog pools and marginal heathland/bog
Hen harrier	SPA	Nest heath, forest-bog, hunt all
Skylark	LBAP, UKBAP	All types (heath, bog, forest-bog)
Twite	LBAP	Nest heath, feed heath and inbye
Red-throated diver	SPA, Ram, LBAP	Small lochans in peatland, loch margins
Black-throated diver	SPA, Ram, LBAP	Larger lochs in peatlands, loch margins
Snipe	LBAP	Flushes, wet grassland on moors
Curlew	LBAP	Wet, dry heath and moorland grass
Ringed plover	LBAP	Loch shores in moorland
Common gull	LBAP	Loch shores in moorland
Short-eared owl	SPA, LBAP	Nest heath, forest-bog, hunt all
Swallow	LBAP	Feed over all habitats
Merlin	SPA, LBAP	Nest heath, forest-bog, hunt all
Golden eagle	SPA, LBAP	Nest heath/crags, hunt all
Stonechat	LBAP	Nest heath, tall herb, feed same and grass
Greylag goose	SPA, LBAP	Nest moorland fens and wet features, also feed inbye
Wigeon	Ram, LBAP	Lochs and lochans in bog, heath margin
Teal	Ram, LBAP	Lochs and lochans in bog, heath margin
Lapwing	LBAP	Wet grassland and heath around lochans and inbye fields
Dunlin	SPA, Ram, LBAP	Blanket bog, loch shores, montane heath and wet heath,
Redshank	LBAP	Wet grassland, flushes and pool systems
Golden plover	SPA, LBAP	Blanket bog and montane heath
Greenshank	Ram, LBAP	Blanket bog, bog pools and loch margins
Red grouse	LBAP	Dry and wet heath, blanket bog

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**Table 2.6 Other Fauna**

Species	Popn. size	Status	Comments
<i>Mammals</i>			
Wildcat ( <i>Felis sylvestris</i> )	Unknown	Restricted Range	Montane and bog habitats
Mountain hare ( <i>Lepus timidus</i> )	Unknown	Restricted Range	Montane and heath
Otter ( <i>Lutra Lutra</i> )	Unknown	UKBAP,	River SAC interest, also using lochs and bog pools
Water voles ( <i>Arvicola terrestris</i> )	Unknown	UKBAP; D	Flush and streamsides
Pipistrelle bat ( <i>Pipistrellus pipistrellus</i> )	Unknown	D	Feeding over heath, bog and inbye habitats
Pine Marten ( <i>Martes Martes</i> )	Unknown	Restricted Range uncommon LBAP	Montane, heath and forest-bog areas
<i>Reptiles</i>			
Adder ( <i>Vipera berus</i> )	Unkn wn	locally common but declining in the UK	Heath, wet grassland, loch margins, blanket bog and probably montane
<i>Invertebrates</i>			
<i>Agrypnia obsoleta</i> Caddis fly	Unknown	NR	bog pools & lochs
<i>Nemotaulius punctatolineatus</i> Caddis Fly	Unknown	RDB2	bog pools & lochans
<i>Oreodytes alpinus</i> Beetle	Unknown	RDB3	Shorelines of lochs
<i>Coelambus novemlineatus</i> Beetle	Unknown	NR	
<i>Aeshna caerlea</i> (Odonata) Dragonfly	Unknown	Nationally notable Cat. B	Breeds bog pools, hunts bogs, heaths, woodland

G? = status uncertain, possibly globally threatened

D = decline in numbers/range in the UK by over 25% in the last 25 years.

NR = Regionally notable

RDB2 = Vulnerable

RDB3 = Rare

## 2.3 Context - Public Access

Although RSPB's largest UK reserve, Forsinard Flows is defined within RSPB's UK reserve system as a Quiet Enjoyment site largely owing to its remoteness, wild nature and restricted access opportunities. However, significant effort is put into visitor engagement and a Visitor Centre is located in the old station building at Forsinard and is easily accessed by road (A897) and rail. As long ago as 1997 a consultants report found that the visitors to the reserve spent £187,000 into the local economy and this figure would be significantly higher today. The short Dubh Lochan Trail self-guided trail takes visitors through a small set of bog pools close to the centre, and visitors can see a 40-minute video showing the reserve and its wildlife through the season. In most years, live footage of a hen harrier nest is relayed back to the centre. Quality interpretation is vital for this site and an Information Warden is employed for four months of the year to man the centre, lead guided walks and participate in Fun Day events on the reserve. Two local part time field teaching staff are employed to run a schools education programme based at the reserve.

A large area of Forsinard Flows became declared as 'The Flows' National Nature Reserve in August 2007 following a review of the NNR suite in Scotland by SNH. It was selected as it provided for the best public access and opportunity for enjoyment and learning in the blanket bogs of Caithness & Sutherland. SNH assessed that this public access was compatible with the continued management for 'Primacy of Nature' requirement, which also has to be met on an NNR. RSPB are working closely with SNH and the Peatland Partnership to further develop the opportunity and quality of visitor access and experience at Forsinard and other sections of the reserve including the recent upgrades to the visitor centre at Forsinard (2008), the new trail at Forsinain (2007) and the 'outdoor classroom' extension on the Dubh Lochan Trail (2008). The later and the upgrading of other sections to improve schools access were funded by SNH.

Specifically in relation to the area of the reserve included in this Plan the application area includes the FCS section of the Forsinain Trail. This 4km trail was opened in 2007 by Jamie Stone MSP as part of a well-attended opening walk. RSPB, FCS and SNH developed the route, infrastructure, leaflet and interpretation plan under the umbrella of the Peatland Partnership. It takes in the RSPB Forsinain Farm fields, Halladale River banks and bog pools and forestry within the FCS Forsinain plantation. The trail is already being well used by the local community and visitors and can be further developed through restoration management of peatland areas. The interpretive concept was to put over messages about differing land uses in various habitats in the peatlands. The Flows National Nature Reserve boundary lies adjacent to the South side of the Dyke project area and to the West, South and East sides of the Forsinain project area.

### Visitor capacity, facilities and services

Facility	Comment
Information staff	Information warden May to end of August
Car Park	Parking for 7 cars and one coach, disabled parking marked
Visitor centre	Opened in 94 by Highland Council, upgraded by RSPB 95, 07
Toilets	Adapted WC for disabled visitors
Nature Trails	1.5 mile flag stone walk way around pools complex
Guided walks	Twice weekly 3 hour guided walks May to end of August
Hen harrier CCTV	Live pictures from Hen harrier nest May to July
Peatlands Video	38 minute video of the peatlands produced by the RSPB
Facilities for visitor with disabilities	Adapted WC, access ramp into Visitor centre
Facilities for children	Hands on displays, jigsaw puzzles
Events programme	c4 events a year

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Reserve leaflets	Full colour free to visitors, 3 languages
Other Leaflets	Dubh Lochan Trail self guide leaflet, 3 languages
Publicity and promotion	Brown Tourist signs, poster & leaflets displayed in TIC and local accommodation outlets, member of Visit Scotland, adverts in local press
Display	Peatlands displays in the reserve visitor centre
Trailside communication	Dubh Lochan Trail self guide leaflet
Flow Country partners weekend	Annual weekend held at Forsinard for Flow Country Partners supporters

### 2.3.1 Key Features – Public Access

Our aim is to maintain and enhance the integrity and quality of the peatlands on the reserve, along with the assemblage of birds, other species and habitats and to positively influence the management of other Peatlands in Scotland. The reserve will also be used to raise awareness of the peatlands amongst local communities, schools and visitors in an environmentally sensitive and sustainable fashion. For the wider reserve, the following targets are included in the reserve management plan:

#### To promote opportunities for lifelong learning and advocacy

##### Reserve Targets:

- Have contact with 5-10,000 visitors per year
- Recruit volunteers for 3 residential volunteer posts annually
- Engage with at least 12 local schools at Forsinard Visitor Centre each year
- Establish further outreach work with schools additional to on site work
- Be an active member of the Caithness & Sutherland Visitor Attractions Group and the North Highland Tourism Operators Group
- Further develop the new trail at Forsinain in partnership with NSCFT and SNH and produce interpretation panel to compliment leaflet
- Support visits from higher education institutes
- Actively promote research opportunities on peatland management, carbon and ecosystem services
- Maintain and improve our volunteer induction and appraisal systems
- Provide information on other local visitor attractions in the visitor centre at Forsinard
- Maintain current field and classroom education sessions for local schools and increase further outreach work at local schools
- Continue to support pre-school leavers wishing to come to RSPB for work experience placements
- Maintain regular contact & relations with local press and media team at SHQ
- Promote the site to demonstrate how conservation, sporting and agricultural objectives can be achieved by multi-use land management

#### To build and retain the support of key stakeholders

##### Reserve Targets:

- Maintain good communications with neighbouring landowners, managers, local community and their representatives
- Maintain working links with sporting and agricultural tenants

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- Hold at least one formal meeting per year with SNH and maintain regular contact throughout the year, ensure all legislation is complied with and NNR standards are met.
- Attend two Northern Deer Management Group meets per year and continue positive working relationship with other bodies such as SEPA, DCS, SEERAD, Caithness District Fisheries Board, Historic Scotland and local tourism groups
- Contribute to the economic and cultural well being of the local area

### **3. Project Management & Delivery**

From the Forsinard Flows Reserve Aims and Objectives, the following section lists the key identified ones for this project.

#### **3.1 Project objectives and targets**

**Key long-term project objectives will be to:**

- Restore the acquired area of forest and open land back to treeless open blanket bog and associated habitats
- Restore the associated vegetation, key bird and other biodiversity
- Return the hydrology towards one a state capable of supporting active bog growth
- Allow populations of key peatland birds on the neighbouring NNR/SPA/reserve to recover from the negative edge effects exerted by these areas of standing forest
- Maintain and enhance the statutory site condition of neighbouring designated sites where within our management control.
- Contribute significantly to Scottish and UK Government BAP targets for blanket bog, hen harrier and other species including water vole
- Contribute significantly to government targets for protecting and managing organic soil carbon stores and climate change mitigation.
- Work closely with local community to maximise the local employment, social, economic and environmental benefits whilst achieving key restoration objectives.
- Support sustainable long-term employment through ongoing management of deer, grazing, tourism and conservation interest.
- Ensure that the massive carbon store in the deep peats below these plantations (estimated to be 20 to 40 times greater than that in the tree crop) is protected from further loss to the atmosphere/streams and is returned to a carbon neutral or sequestering condition.
- Collaborate with research institutes to better understand these habitats, carbon dynamics, ecosystem services and implications of management practice to inform local, regional and national climate change policies.
- Further develop the public access, enjoyment and understanding of these areas including on site work on interpretation of Forsinain Trail, 'off site' at the nearby Forsinard Flows Visitor Centre and through our reserve schools education programme.
- Maintain and develop engagement with the public, RSPB members, key local stakeholders and promote life long learning.

### **3.2 Management and reporting arrangements**

Once acquired, the site will be managed under the RSPB's Reserve Management System. This provides the process and management structure for overseeing the development, resourcing and cost effective implementation of the management plan, including annual monitoring and evaluation against biodiversity, amenity and visitor targets and the development of initiatives to further integrate the project with the local community. It will be integrated with the existing Forsinard Flows 2007 –2012 Management Plan on which re-drafting will commence in 2011.

### **3.3 Project Team**

The project will be managed directly by the Forsinard Flows Senior Site Manager. Expertise will be drawn from other RSPB operations for specific aspects of this project. The project management group will comprise of the following:

- Regional Director
- Senior Conservation Manager
- Senior Site Manager
- Regional Land Agent
- Communications Manager
- Fund Raising Manager
- New Reserve Warden
- 3 existing Site Wardening staff
- Regional Ecologist
- 2 long term volunteer posts
- Peatlands Natural Apprentice

### **3.4 Team member roles**

Nine of the above thirteen people will be directly involved in delivery, with eight being site based at Forsinard Flows Nature Reserve including the new warden recruited to provide the extra capacity required to manage this new project.

RSPB will recruit for the new Warden role and is confident of finding a suitable qualified candidate able to provide the additional staff capacity to deliver this project. We would wish to recruit this individual six months prior to the commencement of on the ground management works as pre planning survey and organisation of contracts will be particularly time consuming on this large site.

Six individuals will be indirectly involved in the project's delivery and their involvement will be as follows:

- The Regional Director will integrate the project into Regional work plans in North Scotland and oversee in particular the acquisition stages of the project. The Senior Conservation Manager will report directly to him.
- The Senior Conservation Manager will oversee the development of the project. The site manager, communications manager, regional ecologist and land agent will report directly to him.
- The Communications Manager based at the North Scotland Regional Office in Inverness will be responsible for media relations, distribution of press releases and the production of interpretation signs and materials.

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- A project fundraising manager will be assigned to the project from the Scottish marketing team to ensure that a robust fundraising plan is adhered to, funder requirements are met and that the project has long term financial sustainability.
- The regional ecologist will be appointed to the project from the regional office to lend expertise over habitat management, monitoring setup and coordination with research partners working on the site.

### 3.5 Experience of Team

#### **George Campbell, Regional Director, North Scotland**

George Campbell has been Regional Director of RSPB Scotland's, North Scotland Region since April 1997. He has previously been employed as a Project Officer for the Highlands & Islands Development Board, a Programme Manager for a EU LIFE Programme and Director of the Scottish Crofters Union.

He has also held board appointments with Highlands & Islands Enterprise, The Deer Commission for Scotland, Eden Court Theatre, Calman Trust Housing Association, John Muir Trust & Highland Theological College. He was also treasurer for the Not for Profit Landowners Group.

#### **Dr Pete Mayhew, Senior Conservation Manager for RSPB North Scotland.**

Overall responsibility for 25 nature reserves covering 40,000 ha of land, 45 staff and £1.2 mill budget. Chaired two LIFE funded Peatlands projects which delivered c £5mill. of work in the Flows between 1995 and 2006, including the Strategy for the Caithness and Sutherland Peatlands, launched in 2005 by the then Minister for the Environment. Formerly, Head of Conservation at the British Association for Shooting and Conservation and a research ornithologist with Glasgow University and the Wildfowl and Wetlands Trust. Member of the Board of Deer Commission for Scotland. Chair of Capercaillie BAP Group.

#### **Norrie Russell, Senior Site Manager Forsinard Flows Nature Reserve**

Norrie has managed the Forsinard Flows reserve for 15 years since its original purchase in 1995. This has involved delivering the reserve based restoration works from two EU funded Life Nature projects plus additional forestry removal and drain damming works resulting in over 1,900ha of forestry restoration to bog and installing of over 9,000 dams on hill drains across the reserve. Current management of RSPB's largest nature reserve in the UK includes deer management through leases to four neighbouring estates, a 1,200ha farming partnership, fishing management on 22 lochs, visitor centre and trails. He sits on Melvich Community Council, Caithness & Sutherland Visitor Attractions Group, Caithness Biodiversity Group, Northern Deer Management Group, Plantlife's Munsary Management Committee and is Vice Chair of Halladale Hall & Amenities Committee. Prior to Forsinard he worked as the Area Advisory Officer, SNH covering Argyll & Bute and previous to that for National Trust for Scotland and the Forestry Commission.

#### **Mary McLellan, Land Agent, RSPB Scotland**

Mary has been with the RSPB since 2008, carrying out Land Agency work for RSPB

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reserves in the north and west Highlands and Islands, including Forsinard. She is a graduate of St Andrews University, member of the Royal Institution of Chartered Surveyors, and has many years experience as a surveyor and land agent in the North of Scotland, having worked previously for the Valuation Office Agency and the Forestry Commission.

### **Alan Tissiman, Communications Manager, RSPB North Scotland**

Alan joined the RSPB in August 2009 after working for nine years in the higher education sector for the UHI Millennium Institute based in Benbecula and Inverness. He project managed the development of a number of UHI courses in the field of online learning and latterly worked as Head of Student Recruitment and Business Development. Between 1993 and 2000 Alan worked in economic development and inward investment in the North East of England and the West Midlands. He has also worked in asset finance and politics. Alan is a graduate of the University of Wales and has an MBA from the University of Durham.

### **Katy Malone, Reserve Warden, Forsinard**

Katy has been employed at RSPB Forsinard reserve since 2002, near the start of the Life Peatlands Project (2001 - 2006).

Before this, she gained a 2:1 Honours degree in Behavioural Biology at the University of St Andrews and completed contracts for the RSPB as a Reserve Assistant on Orkney and Project Assistant on the Dorset Heathlands, felling trees and disposing of brush. Initially as Project Officer at Forsinard she compiled progress reports, wrote felling licence applications and grant reports, supervised the felling of almost 2000ha of conifer plantation and surveyed and marked over 8,000 dam locations.

Latterly as one of the two Reserve Wardens, her main roles are to manage the GIS mapping software systems, organise a monitoring programme for the habitat restoration work and assist with the day-to-day running of the reserve, in particular the visitor centre which attracts 4-5000 visitors annually.

### **Second Reserve Warden**

\*The second Reserve Warden post is currently being advertised following the recent promotion of that post holder.

### **New Reserve Warden**

A further new Warden post is to be recruited to deliver this project.

### **Danni Klein, Assistant Warden, Forsinard Reserve**

Academic qualifications: Intermediate Diploma in Landscape ecology- University of Oldenburg, Germany, MA (Econ) in Environment and Development- Manchester University.

Scottish Wildlife Trust 2.5 yrs. Reserve Ranger for three seasons managing the day-to-day running of the reserve, carrying out all survey and monitoring, managing a team of 40-50 volunteers per season and overseeing contractors and work parties in infrastructure maintenance. Contract work in writing management plans for three Lothian reserves and assisting with grant applications.

RSPB Forsinard 2yrs. Managing the peatland apprentice and a team of long-term volunteers in the delivery of survey and monitoring and management of conifer

regeneration across the whole reserve. Assisting with the development of survey methodologies and delivering the training. Forestry survey work includes drain blocking and monitoring, tree volume measurements and vegetation surveys.

### **3.6 Details of partnership working with other organisations**

We are working closely with a number of partners on this project including

- North Sutherland Community Forest Trust who hope to acquire the other sections of the two blocks and we hope to have mutually beneficial management arrangements in place, whereby for example, we help with advice on habitat restoration, supply timber to the community mill at Forsinain and they undertake some of contract work.
- Scottish Natural Heritage who support the proposal and for whom we manage the neighbouring Flows National Nature Reserve and parts of the Natura sites.
- Forestry Commission Scotland in relation to environmental assessments, felling licences, forest and water guidelines, grant aid and input to strategic framework for forestry in the Flows.
- Research partners including Centre for Ecology & Hydrology, Macaulay Land Use Research Institute, University of St Andrews and University of Highlands & Islands -Environmental Research Institute who are already undertaking studies on the reserve and are keen to use this site for study.
- Scottish Environment Protection Agency who will be consulted over hydrological water quality and phasing of felling plans.
- The Highland Council and local Melvich Community Council over employment opportunities and road infrastructure impacts.
- The Peatland Partnership and wider community forum which SNH, RSPB, FCS lead and which works to progress the aims of The Peatlands of Caithness & Sutherland Management Strategy 2005-2015, with the Senior Conservation Manager sitting on the steering group.
- Bighouse Estate, who own land in close proximity to the proposed acquisition site and carry out red deer management for us on this section of the reserve and for FCS at present.
- Private enterprises looking to develop local timber, woodfuel markets and transport over compatible timescales.
- Owner-occupier of Craggy Croft adjacent to Dyke site who also manages the Forsinain Farm section of the reserve adjacent to the Forsinain block through a partnership with RSPB.
- River Halladale Partnership for which these blocks form part of their salmon river catchment.
- Caithness, Sutherland and Highland BAP groups relating to delivery for key BAP habitats and potential survey for key species such as water vole.

Letters of support for our proposal will be supplied as part of NFLS application.

### **3.7 Plans for volunteer involvement**

The RSPB has considerable experience of providing volunteering opportunities at our nature reserves. We have run a residential volunteering scheme based at Forsinard Flows for over 10 years and have a good track record of both volunteering experience feedback and training up volunteers

going on to find related employment. We particularly attract long term volunteers who come for 2 to 12 months at a time and carry out extensive monitoring, survey and analysis work and receive training in these areas as well as reserve management such as forestry work, bog restoration, farm management with training. We currently have a 15-month Natural Apprentice post running, which has a training input and responsibilities similar to a full time post.

We normally have three volunteers on site at one time and would have around 12 volunteers during a year. The volunteers will be fully involved with the survey, planning and monitoring of this project.

### **3.8 Community engagement**

We have had long term discussions over the acquisition of both blocks with the North Sutherland Community Forest Trust (NSCFT) who are hoping to acquire the better grown areas of trees on better soils with easy access for management and future timber extraction. The RSPB has been working closely with the NSCFT for a number of years and in particular over providing contract work on felling and extraction for forest workers trained by the Trust in our Bhaird restoration block 2002 to 2004, including contribution to extraction costs to allow testing of extraction methods and machinery. Training courses run by NSCFT have been held on the reserve eg wood chipping. In 2007, we held a joint open day for the NSCFT Forsinain sawmill and to celebrate the National Nature Reserve designation of the RSPB reserve.

The NSCFT membership includes a significant proportion on the population on the north coast of Sutherland who have an interest in woodland management. Discussions have gone well and various mutually beneficial potential acquisition boundaries have been agreed to mesh our separate applications to the NFLS. We have identified a number of ways in which we can work together (as we have in the past over felling and extraction on bog restoration on the reserve) including supply of timber to the NSCFT sawmill at Forsinain and purchase of fencing materials. The Trust support our application and restoration plans but would prefer that our felling timescales were extended to over 5 years to maximise timber extraction and have suggested that RSPB consider supplying timber free of charge - see below for further discussion of these issues. RSPB's Forsinard Flows Site Manager, Norrie Russell attended the NSCFT's AGM on 28 Oct 2009 to discuss working together and any concerns.

To consult within the wider community we issued a press release on 9<sup>th</sup> October to local papers raising awareness of our plans and inviting everyone along to view information and discuss our plans with reserve staff. The open house consultation was run from 2 to 9pm on 29 October 2009 in Melvich Community Hall. Key decision makers in the local community were also invited by email to attend the consultation meeting and included ward regional councillors, community council, MP, MSP, NSCFT, UHI and local Biodiversity Groups. It was not expected that there would be a great deal of local interest given that RSPB have been acquiring plantations in the blanket bogs around Forsinard almost annually since 1997 and have restored 1,950ha to date. Attitude and awareness studies carried out within the Life Nature Projects have shown significant and increasing support for such work within all sections of the local community including key stakeholders and policy makers. At the open meeting, which took in an afternoon and evening to allow working people to attend, 11 people came in to discuss our plans. Normally this type of open house consultation would be expected to be of interest to people with concerns over the proposals. It was

therefore extremely encouraging that the vast majority of feedback responses were positive and supportive. Key topics discussed were wildlife tourism, international environmental profile, potential jobs in the light of economic run down at Dounreay, integration of different types of land management and, of course, environmental benefits to peatlands, birds and other wildlife.

**Issues that came up through the consultation were:**

1. Need for NSCFT and RSPB to work in a joined-up approach to maximise local benefit and gain external funding
2. Give public access considerations sufficient weight in plans
3. Do locals and tourists see the benefits?
4. Early cutting would reduce the amount, value and steady flow of timber and benefit to NSCFT
5. NSCFT would lose their current stake via the management agreement with FCS in those sections of the blocks which they do not acquire
6. NSCFT have suggested extending period of timber supply from extraction work as well as being provided with free timber for the Forsinain Mill and much reduced cost to the local community
7. How will long term employment for locals be supported?
8. Are there training and development opportunities for local people and companies and how will these be communicated?

**These have been addressed by:-**

1. Initially attending NSCFT committee meetings to agree areas of interest, provide management survey information collected in the field to date and attend NSCFT's AGM. At the latter, there was a long and useful discussion over concerns and areas of mutual benefit with the directors and three other ordinary members present. We will continue to build dialogue with the Trust based on results of District Valuer's report, success of respective acquisitions and community feedback.
2. The Forsinain Trail, which runs partly through one of the blocks, was identified, planned and much of the ground works and interpretation carried out by the RSPB Forsinard Flows staff team in partnership with FCS, SNH and Peatland Partnership. We give public access, both for locals and tourists, a high profile at this reserve and have spent large amounts of time and money on developing visitor facilities in the last two years. We will give potential enhancement to these facilities in Forsinain and Dyke a similar level of priority.
3. The existing visitor facilities, staffing and events programme at Forsinard Flows has been shown to attract over £187,000 per annum of visitor spend into the local economy creating 5 full time job equivalents in the local area. This will be supported and enhanced by attracting visitors who support and appreciate the habitat and wildlife restoration management carried out at Forsinard by RSPB. RSPB will run an appeal to its membership (over a million members) to fund acquisition of these blocks and, as well as awareness raising of the area to that membership, it is likely that over 50,000 members will directly support the project and have a strong link with the area. This will have undoubted benefits through holidays taken in the Far North to visit the reserve. The project will support existing employment in forest restoration work on the reserve plus additional contract work creating 6 new jobs including

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skilled machine operator jobs and hopefully allow the NSCFT sawmill to start operating at a level where it is also capable of employing staff to run it.

4. The early felling of these blocks (currently estimated at between 5 and 15 years depending on tree age and wind throw risk) will undoubtedly reduce the total amount of timber that would be produced at full rotation. There are, however, huge areas of forestry locally planted at the same time, which will mature at the original predicted felling period and will be available for purchase by NSCFT for the mill. Our felling will produce some timber ahead of this future glut at a time when these blocks would be planned to produce nothing. Timber supply will therefore be brought forward with supply curves smoothed to the benefit of local processing.
5. Whilst NSCFT will lose their current management agreement with FCS on those areas of the blocks eventually acquired by RSPB, by working closely with them we would hope that they can benefit directly from our restoration felling as outlined in 4 above.
6. To address the NSCFT concerns over timber supply we will review the options for retaining an area of appropriate timber in Forsinain and possibly Dyke. This will be possible once it is clarified which areas NSCFT and RSPB finally acquire, whether there are non-damaging wind firm trees which are likely to have extractable saw logs in them on better soils and what the likely supply need may be once the mill is operating fully again. This area would then be felled over an extended period beyond 2016 to create supply at a time when these plantations would not have been producing any timber normally. As income from timber sales is an essential part of covering part of the felling and extraction costs, and as we have obligations to our members as a charity, free timber provision is unlikely to be possible. We would however look to give NSCFT priority of supply at market value with proximity to the mill ensuring low at mill material costs. We would like to explore how we could integrate with any developing local wood fuel networks to maximise local use of product.
7. Long-term employment will be supported as previously stated in this application and attached business plan. It will be significant with over £2million of local contractor spend on management works, will create a new post at Forsinard, will support indirect jobs in timber haulage, processing at a quiet time for local forestry and provide long term land management opportunities. Tourism benefits as described elsewhere as will support the North's largest employment sector.
8. Awareness of the project and resulting development opportunities will be created through local communication, media work and discussions with organisations addressing local employment such as those concerned with the effect of decommissioning Dounreay. New opportunities will be created particularly in the felling and extraction of timber. We will work with local training agencies and relevant partners such as NSCFT to address any gaps in the skills base.

Community Engagement will additionally involve:

1. Continued close working with NSCFT
2. Press releases to raise exposure and awareness through local media
3. Events promoting our plans for the site with an open house local consultation planned for 29 October 2009 in Melvich Hall
4. Direct discussion with key community representatives
5. Promoting local employment and processing
6. Investigate setting up a local woodfuel network
7. Enthusing local volunteers to become involved with the project

8. Continuing to develop visitor facilities such as the Forsinain Trail which can both provide local access and recreational facilities and attract tourism and visitors.

### **3.9 Plans for use of contractors**

We will be using seven main types of contractor to support this project:

1. Mechanical forestry operators
2. Motor manual forestry contractors
3. Hydrological management - mechanical
4. Hydrological management – manual
5. Timber transport contractors
6. Fencing contractors
7. Deer management

Following similar forest to bog restoration work managed on the reserve since 1997 on over 1,900 ha of forestry, we would plan to use locally based contractors who have carried out that work including mechanical and chainsaw tree felling, machine dam and hand built pile dam installation, fence removal and erection. Deer management will hopefully be carried out via the ongoing lessee on the surrounding open bog to ensure integration of deer management to maximise environmental and employment stability and opportunities.

We have used a preferred contractor system (based on one used by FCS) to help award contracts in a way which maximises local benefit, quality of work as well as cost effectiveness. As the body having carried out the greatest amount of this type of restoration work in the Flows (and UK) over the past 12 years we now have a good pool of highly expert and established contractors in the area to carry out this work.

One key new aspect of management in these two blocks will be the trialling and implementation of timber/product extraction from parts of the ground. Discussions have been held in relation to mechanical extraction work in previous fellings and NSCFT extracted some material from one block but this will largely be a new area of contractor work.

There are established felling and extraction contractors in the North Highlands with machinery and expertise capable of developing working practices to allow timber extraction on these challenging sites and we would work closely with them to develop techniques that minimise environmental impacts.

### **3.10 Involvement of other bodies**

As detailed above we will be working closely with a number of partners on this project including Forestry Commission Scotland over strategic approach to forest to bog restructuring, environmental assessment, felling licences, management guidance, advice on methods and grant aid for certain management works. Scottish Natural Heritage over strategic approach, designated site and species conservation, management advice, NNR and visitor facilities and grant aid. Other bodies will be involved as specified above.

## 4. Methodology and Approach

### 4.1 Land purchase

Negotiations are ongoing with the Forestry Commission Scotland over this acquisition through their National Forest land Scheme as 'Sale of Surplus Land' to an appropriate environmental NGO. FCS has instructed a new split DV valuation to inform the process and to help NSCFT decide where it wants to pursue acquisition. Discussions have been undertaken with the NSCFT over which areas they are looking to acquire under the community section of the NFLS and how these relate to the areas RSPB are interested in. Whilst there are areas of overlapping interest at present, these are relatively small and the DV valuation will further inform the identification of mutually beneficial boundaries.

The area we hope to acquire is dependant on areas acquired by NSCFT but at maximum is: Dyke – 1,426 hectares or thereby, Forsinain – 279 hectares or thereby.

### 4.2 Project planning and phasing

This acquisition and management project will be integrated into the current RSPB Forsinard Flows Management Plan (2007 to 2012) to follow overall aims and objectives. Similarly, aims and objectives the same as those contained in the Moorland Management Plan, which forms part of our current SRDP Rural Development Contract will be used as the basis of management. The reserve management plan will undergo full re-writing and consulting in 2011 and the Dyke and Forsinain areas acquired will be written fully into the plan as part of that process. The Management Plan is reviewed and reported on annually including reporting on the NNR management to SNH.

Beyond the period covered by this application, the two areas of land will be managed indefinitely as an integrated part of the RSPB's reserve network. Long term sustainability will be maintained by restoration management back to a lower level of required management input typical of open blanket bog and associated habitats, with funding support from members, trusts and relevant funding schemes such as the SRDP.

The phasing of the project will be as follows with explanations of the physical works undertaken are detailed in the next section:

- **Year one**
  - Land purchase (likely to be phased over three years).
  - Undertake surveys of tree crop, wind-firm edges, drains, ground vegetation, key bird and animal species and peat soils to inform planning of phased restoration programme.
  - Consult with FCS enterprise and FCS Research over their Forest Plan, management and research information for the blocks.
  - Continue discussions with key local interests including NSCFT and woodfuel interests over management works and development of local markets (will continue though life of project)
  - Discuss developments in extraction and fell to recycle machinery and techniques with forestry industry specialists.
  - Investigate further amenity use of the blocks

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- Work to remove weight restriction on Craggy bridge to allow future access by contractor machinery.
- Produce a management plan addendum based on the survey data.
- Consult with and apply for relevant consents, licences and planning permissions from agencies including FCS, SNH and SEPA.
- Invite RSPB and external experts on site for survey and other works (this continues throughout the project).
- Set up any identified hydrological, vegetation, bird or other monitoring and collect pre-management data (repeat in future years as identified by agreed methodologies).
- Set up research projects with interested partners (eg looking at carbon related and other ecological services of this work) to allow for data collection before management works take place (will continue throughout the project)
- Recruit an additional warden to help with this work and provide extra office resource (will continue throughout the project)
- Restructure office accommodation to provide suitable office facilities for additional warden.
- Apply for funding and related consent for management works.
- Set up temporary deer management leases to operate until main management works completed.
- **Year two**
  - Items included above extending into year two.
  - Commence first phase of tree felling (continues into years three to six and potentially beyond for selected areas of better quality timber) concentrating initially on poorest trees on wettest most restorable compartments. Little extraction is envisaged from these early restoration areas but if small-scale local demand develops and methods are identified, extraction will be trialled. This approach will also allow continued growth in the more productive tree areas by felling closer to rotation length and allowing new timber markets and techniques time to develop.
  - Investigate options for becoming part of an integrated local wood fuel supply network.
  - Install new deer fences, gates, deer grids to protect neighbouring forestry and open up sections of old deer fence to allow deer movement and controlled access.
  - Alter fencing as required to allow grazing of the riverside grasslands in the Dyke block and support the management of inbye ground including potential wild bird cropping.
  - If NSCFT do not acquire Dyke 'croft', plan its future management as part of management review process.
  - Plan and carry out track maintenance to bring tracks back up to good condition (ongoing after this as required).
  - Control seedling regeneration and re-growth in key FCS Life Project compartments.
  - Maintain the Forsinain Trail and develop existing interpretation and bird viewing facilities including consideration to routing of new fences.
  - Develop volunteer input to all works.
- **Year three**
  - Items included above extending into year three.
  - Control seedling regeneration and re-growth in remaining FCS Life Project felled compartments.
  - Maintenance of fencing tracks and gates

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- Damming of ditches on felled blocks (continues after felling to year 6).
- Review early results of research projects
- Review the management plan and annual report.
  
- **Year four**
  - Items included above extending into year four.
  - Carry out control of tree seedling regeneration and regrowth on areas felled in year two
  - Carry out extraction of timber to roadside and market produce (continues to year 6).
  - Review the management plan and annual report.
  
- **Year five**
  - Items included above extending into year five.
  - Carry out control of tree seedling regeneration and regrowth on areas felled in year three
  - Review the management plan and annual report.
  
- **Year six**
  - Items included above extending into year six.
  - Carry out control of seedling regeneration and regrowth in areas felled year four
  - Review the management plan and annual report.
  
- **Year seven and later**
  - Items included above extending into year seven and beyond.
  - Continue with drain damming.
  - Continue tree regeneration control in tree areas felled in years two and five.
  - Continue with maintenance works until further management no longer required.
  - Market any produce extracted in year 6 still at roadside.
  - Subject to bog vegetation recovery monitoring, consider complete removal of remaining sections of old deer fence to allow natural grazing patterns and density to return.

### 4.3 Physical works to be undertaken

The basic techniques to be used in forest to bog restoration will be based on those used and developed in plantations adjacent to the Forsinard Flows reserve from 1997 to the present. However, as this is a new and ever changing side of conservation management and as there is greater potential for timber extraction it is expected that new approaches will be added, trialled and used. Works and experience to date are detailed in the following paragraphs:

#### 4.3.1 Forest to Bog restoration to date

The felling of conifer tree blocks at Forsinard Flows was carried out mainly through two EU-Life Peatlands Project, which ran from 1994 – 1998 and 2000 – 2006 and were multi-partner projects with the latter being one of the biggest landscape conservation projects in the UK at that time. RSPB have been able to restore 1,951 ha of plantations between 1997 and present, spread across 11 plantations

back to open peatland and moorland (including the 148.6ha Sleach block carried out since the above EU Life Project). This work primarily involved felling of non-native lodgepole pine and sitka spruce planted in the 1980's on these naturally treeless bogs. The plantations shade out the native bog vegetation under them and the dense deep plough furrows drain the deep peat soils, further impacting plants and wildlife dependant on high water tables and eventually damaging the structure of the peat through shrinkage, oxidation loss to atmosphere and erosion into water courses as dissolved and particulate organic carbon complexes. The plantations have also been shown to exert significant negative effects on some of the birds on adjacent peatlands including dunlin and golden plover, which are part of the designated interest of the EU Peatlands Natura site. Red Grouse and skylark are other species that show a negative edge effect to forestry. The restoration is ultimately aimed at getting these adjacent blanket bog areas back to favourable condition for habitat and bird populations, and to restore previous forest areas to a condition where they can also be added to the Peatlands Natura Site.

Most of the felling has been to recycle, with felled trees placed as far into the furrows as possible in rows, to decompose or in many cases become incorporated below the water table into the peat itself as the furrows fill with sphagnum and other peat forming plants such as cotton grass. Areas between furrows have been left clear of felling brash to allow access for essential maintenance work such as control of seedling regeneration and any coppice regrowth which can occur even in these conifer species if not cut well below the bottom whorl of branches. This overall approach is particularly applicable to deep peat areas where use of heavy machinery with high ground pressure for timber extraction would cause significant damage to the peat structure and surviving vegetation. In such conditions the trees have normally grown slowly and their small stem diameter and stand volume (often under 50 cubic metres per hectare) would make extraction costs alone significantly higher than their sale price at forest roadside. Current normal use of forwarding machinery requires large amounts of brash from the branches and tops of the trees to create a brash mat for the machinery to use to support its weight and in these low volume stands most of the tree including stems would have to be used in the mats so that very little can be extracted. Added to this there are very limited markets for this low-grade forest product given the remoteness from population centres, markets and the fragile road infrastructure.

In fell to recycle blocks we have employed three main techniques: -

- Motor manual felling using chainsaws
- Hydraulic tree shear mounted on a wide tracked very low ground pressure digger base
- Whole tree mulcher

The former is most useful and cost effective in very small poorly grown trees (under 30 cubic metres per ha) such as are found on the fringes of pool systems where very wet conditions preclude the use of machinery. Small tree size also allows felled material to be moved into furrows by hand.

The hydraulic tree shear has been the main felling method in recent times as medium sized trees and stands (above 30 cubic metres per ha) are felled cost effectively and felled material can be compressed more effectively into the furrow bottoms by the machines tracks. Thus benefiting rapid return to open bog and maximum capture of woody material in peat growth in ditch bottoms.

An 8ha trial was carried out in 2004 using a horizontal mounted drum mulcher, which both felled and mulched the whole tree crop in the manner of a combine harvester. The results on hydrology

and vegetation recovery are still being monitored as the technique, or related mulching/chipping machinery, could have relevance to felling to recycle stands with bigger trees in inaccessible parts of the plantations. Where not all material is being extracted these techniques have benefits in reducing felled trees to a form where they can better fit furrows and get more material close to or below the water table so its material and contained carbon can be stored as part of peat. The more finally divided material can also form semi-porous dams that will raise water tables with pores clogging over time. They also leave a more level bog surface likely to be colonised quicker by peatland birds and other wildlife. Drawbacks are likely to be increased chance of soil and vegetation damage, increased nutrient pulse from broken down material and potential erosion if significant bare peat surface created.

#### 4.3.2 Forest to bog restoration in Forsinain & Dyke

The following tables show tree crop area by species and age class for both Dyke and Forsinain blocks and are based on information supplied from FCS crop database. Some general information on species yield class is also taken from the same source but field visits to part of the site have shown that growth rates are much more variable than suggested in this data. A more detailed and up to date assessment of the tree crop (along with peat depth, ground vegetation and measures of restorability) will be required to allow the detailed planning of felling process which will take place in Year 1 of the Project. The following does however give an overall picture of what is there.

<b>Dyke Block- All</b>	
Species	Area (ha)
Birch	5
Larch, Hybrid	12
Larch, Japanese	17
Lodgepole Pine	504
Mixed Broadleaves	11
Norway Spruce	1
Scots Pine	24
Sitka Spruce	442
XB	1
Life Felled Trees	136
Non planted	273
<b>Grand Total</b>	<b>1426</b>

<b>Dyke Crop Age Class</b>	<b>Area(Ha)</b>
0 - 10	0
11 - 20	62
21 - 30	955
31 - 40	0
41 - 50	0
51 - 60	0
<b>Total Ha</b>	<b>1017</b>

Dyke plantation was planted between 1982 and 1990, with most of the Lodgepole Pine and Sitka Spruce planted 1982 to 1988. The oldest trees are in the East and North with the youngest trees planted 1987/88 in the West.

It contains 24 ancient monuments and 2 other monuments.

In Dyke the Hybrid and Japanese Larch is given as Yield Class 6 to 10, Lodgepole Pine YC 6-8, Sitka Spruce as YC 12, mixed broadleaves as YC 2 to 8 and Scots Pine as YC 8.

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<b>Forsinain RSPB Section</b>	
Species	Area (ha)
Larch, Hybrid	4
Larch, Japanese	4
Lodgepole Pine	95
Sitka Spruce	48
Open habitats/loch	60
Life Felled trees	73
<b>Total</b>	<b>284</b>

<b>Forsinain Crop Age Class</b>	<b>Area(Ha)</b>
0 - 10	0
11 - 20	0
21 - 30	151
31 - 40	0
41 - 50	0
51 - 60	0
<b>Total Ha</b>	<b>151</b>

Forsinain was planted between 1980 and 1990 but with majority planted 1980-81 and so the crop is older than in Dyke.

The whole block contains 36 ancient monuments plus one other recorded monument to date.

The Japanese and Hybrid Larch Yield Class (YC) is given as 8 to 10, Lodgepole Pine as YC 6 to 10 and Sitka Spruce as YC 10 to 12 but partial field survey would suggest that there are areas where the Sitka Spruce Yield Class for example is significantly lower than this. A full crop mensuration survey will be carried out by reserve staff to update records and to inform the restoration planning process.

As the crop will increasingly damage the peat soil and remnant bog vegetation under growing trees it is important that they are removed as soon as possible to maximise biodiversity and carbon benefits of restoration but logistics, resources and creation of uses/markets dictate that felling will take place over a minimum of five years. Wind Hazard classification for these crops are 5 for most compartments and 3 to 4 for the others with the greatest area of likely wind-throw predicted in the West section of Dyke and the East section of Forsinain. Evidence from slightly older plantations to the south in Kildonan and to the West in Strathy forest, which are experiencing severe windblow (even though on less exposed and more wind-stable sites), would suggest that wind-throw and crop loss is likely when the crop reaches around 35 years of age. This will particularly threaten lodgepole pine on deep peat soils. For Forsinain this would be around 2015 and for Dyke 2019. Once any area was affected by windblow, the costs of restoration or extraction would increase massively and require additional significant funding to clear. Windblow areas would be of no economic or environmental use and should be avoided at all cost. As the areas most threatened by wind-blow are also the ones we would restore first back to open bog and we plan to start in 2011 (Year 2 of Project) we will in effect only be bringing forward the earliest fellings by 4 to 8 years. As previously stated this also has the benefit of potentially producing local timber slightly ahead of the huge predicted timber production that will come out of the surrounding plantations in the Forsinard area which were largely planted between 1980 and 1988.

The felling process is therefore planned to take place primarily over a 5-year period during which 1,168ha of standing trees will be felled and where feasible/sustainable timber will be extracted. In general the younger trees are planted on deep peat areas and so will have done less damage to the deep peat soils having closed canopy fewer years ago. These areas will also have the lowest

accumulated crop volume and so will be targeted for felling, mainly as fell to recycle, in the early years of the project (Years 2 and 3).

The North Sutherland Forest Trust have asked if we would be able to extend the felling period to provide some of their timber requirements between our main fellings and either their own acquired, or neighbouring blocks, reaching felling maturity. Whilst neither Dyke nor Forsinain would have been producing timber in this period between 2016 and FCS planned felling, we have identified sections of Compartment 4254 in Forsinain where the crop could be retained beyond 2016 with a view to NSCFT extracting for use in the local mill. Subject to ground survey, there may be additional sections of Forsinain such as parts of Compartment 4255 and Dyke Compartments 4260-68 which could be retained in addition to any of these blocks acquired by NSCFT themselves.

Without accurate crop growth rate and volume data it is impossible at this stage to identify what size of an area would be required to provide any significant part of the NSCFT mill requirement for saw logs and/or chipping biomass. The proportion of saw log volume within stands cannot for example be estimated accurately at present. NSCFT (pers comm.) predict that they require 10ha per annum of fully mature crop containing 350 cubic metres of stem timber per hectare, of which 50 will be saw logs, for the mill at full production. In the years 2010 to 2019 we would predict that total crop volumes will be around half this and have a smaller percentage of timber of saw log size. If for example, it is assumed that 5% of the crop would be of saw log size and total crop stem volume averaged 160cubic metres this would yield 8 cubic metres of saw logs per hectare. Therefore, 20ha felled and extracted would provide 160 cubic metres of saw logs each year, which would equate to a third of the maximum saw log requirement of the sawmill. The same blocks could also yield around 3,000 cubic metres of woodfuel timber for chipping per annum. Between years 2016 and 2019 (when early fellings from other local blocks should start to become available) 80 ha of retained trees on good ground conditions could therefore potentially supply around a third of mill saw log need and three quarters of wood chip needs with above assumptions.

RSPB will therefore explore with NSCFT the options to extend felling beyond the currently planned Years 2 to 6 over a small proportion of the crop to create local supply when none would otherwise have existed. The balance of requirement in the NSCFT mill will have to come from other sources as at present such as mature phase plantations further away in Borgie and Strathnaver. How feasible and where such areas lie will depend on the areas acquired by NSCFT and full crop survey and planning in Year 1.

In deciding if extraction of stem timber or brash material is desirable, full account will be taken of all current FCS Guidelines and advisory notes on management of brash, whole tree harvesting and protection of water courses, archaeology, wildlife and peat soils. Whilst extraction is normally carried out on deep peats using brash mat forwarder systems in modern forestry, investigations will be carried out into the feasibility of excavator mounted cable crane extraction or other whole tree harvesting techniques in Year 1 of the project.

Where felling to waste/recycle is proposed, chipping and mulching will be reassessed as alternatives to hydraulic shearing, subject to the outcomes of research on environmental impacts and costs carried out both on-site and via investigations elsewhere by FC Research and others.

### 4.3.3 Control of Tree Seedling Regeneration and Conifer Regrowth

On intact blanket bog with a high water table and light grazing by red deer, in most cases seedlings from non-native conifers may germinate but will not survive long term. However, on forest to bog restoration sites where drainage and ground vegetation has been altered and grazing levels have been reduced variable amounts of seedlings will establish and survive. It will be essential to control any regeneration of tree seedlings or regrowth from felled trees to ensure restoration to a treeless bog surface. Conifer seedling regeneration managed to date has been highly variable both between and within felled blocks with some evidence that the wettest, most restorable bog areas can contain denser seedlings requiring removal. Failure to control regeneration could result in complete re-colonisation of the bog by conifers and is an **essential** part of any restoration back to open blanket bog. The most efficient way to ensure restoration back to open peatland is to carry out control on the conifers whilst they can be pulled from the peat complete with roots, for example by hand. Although all seeds of these conifers germinate within a year, some seedlings can remain very small as 'stored seedlings' for one to two years and be easily overlooked by contractors. We therefore propose to base had pulling control by contractors after 2 growing seasons post felling with a second visit to catch the stored seedlings at year 5 after felling. Where seedling growth is dense enough to make it more cost effective, we will use brush cutters and/or chainsaws to control it. Allowing deer access back into the felled areas will also be a key part of seedling control as they can kill large numbers of seedlings by pulling from the ground while small. Our deer fence opening and new fence erection will allow this to happen and for grazing levels to be controlled to enhance vegetation recovery.

In the forest to bog blocks felled by FCS during the last Peatlands Life Nature Project, regrowth has been left to grow on with a view to later motor manual control of surviving regeneration and regrowth. In these areas, we will therefore employ contractors to cut this regrowth, which is now often 2m tall, using chainsaws and brush cutters. Area costs will be significantly higher in the dense areas in the centre of Forsinain for example, but it is hoped that this will be a one of cost rather than two visits as proposed for the newly cut areas. Key areas where regrowth is starting to bear cones and visible areas in high amenity areas such as along the Forsinain Trail will be tackled first in Year 2 of the project with the remainder completed in Year 3.

### 4.3.4 Drain blocking

As with all peatland restoration the water table is the most important controlling factor in peatland development and maintenance. At Forsinard within the felled forest blocks, we have concentrated effort on blocking collecting drains within forestry. Trial work within the first EU-Life Project (1994 – 1998) showed that furrow blocking using sheet dams was prohibitively expensive and that on suitable peat depths and low slopes furrows re-vegetate and infill at an acceptable rate without further damming. There are also green house gas benefits to this approach as it allows the water table to be gradually raised in furrows as developing sphagnum regrowth draws it upward. This maximises carbon capture and minimises methane emissions. Unlike all of the private forest blocks restored by RSPB to date, which have been very deeply ploughed, the FCS blocks involved here do contain many compartments, which were shallow ploughed. The water table and associated bog vegetation in these compartments will recover much more quickly as a result. Indeed, in parts of Forsinain where trees have grown very poorly with large gaps where trees have died allowing continued sunlight penetration, sphagnum recovery has been extremely rapid, even growing into

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small hummocks above the original surface! If new cheaper techniques of blocking furrows or re-profiling bog surfaces are developed then these will be trialled in the deep ploughed sections.

Collecting drains in all forestry plantations felled on the reserve will therefore be blocked using techniques developed during and since the EU-Life Peatlands Project (1994 – 1998). Two types of dam will be used in combination: two to six plastic pile dams will be installed at the downstream end of the drains to act as sediment traps to benefit water quality in downstream in water courses and lochs. Machine-built peat or additional plastic pile dams will be used upstream from these to raise the water table along each dam. These vegetate rapidly with sphagnum and this helps to trap nutrients released in any decomposition pulse post harvesting. Numbers of dams required have been estimated based on densities of dams required in 1,900 ha of forest to bog restoration carried out on the reserve to date.

Dam location will be identified and marked by ground survey using line levels to mark 250mm height drops between dams, with locations based on aerial photographs and recorded using 10 fig GPS and cane markers. Trained reserve staff will carry out this work, with contractors skilled in use of low ground pressure excavators and installation of pile dams employed to carry out the work.

All current FCS Forest & Water Guidelines (Version IV) will be followed.

Numbers of dams installed in each 'forest to bog' restoration block to date on Forsinain:

<b>Plantation</b>	<b>Pile dams</b>	<b>Machine dams</b>
Clach Geala	18	49
Bhaird	37	319
Caol	33	122
Imriche	102	191
Alltan Dubh	47	216
Lonielist	118	393
Cross Lochs	190	771
Leir	29	113
Crubag	20	87
Casan	30	278
Sleach	15	49
<b>Total to date</b>	<b>639</b>	<b>2588</b>

Similar to the hill drain situation, we are already undertaking a programme of monitoring, repair and replacement of forest drain dams to ensure full recovery of active bog vegetation and achieve all long term objectives.

### **Monitoring & Research**

Collaboration research will be developed with the University of St Andrews, CEH, MLURI and the Environmental Research Institute in Thurso to provide information on the effectiveness of hydrological restoration work including forest drain damming on improving water quality, water flows, protecting carbon stores in the peat and climatic warming mitigation of forest to bog habitat restoration.

#### 4.3.5 Grazing & Fence Management

If RSPB are able to acquire the identified areas in Forsinain and Dyke our overall aim will be to allow red deer access to the acquired area from year 2 to allow low-level grazing/browsing capable of helping to control any regeneration of tree seedlings once felling works commence. This will be particularly important in these two forest blocks where the felling programme will be phased over a number of years, which means that there will be a potential seed source remaining until felling is completed. Deer are most effective at removing seedlings completely by pulling the very small ones out of the ground soon after germination.

In Forsinain, we therefore plan to erect 2,200m of new deer fence along the West boundary of the acquisition area to prevent deer accessing the remaining forestry to the West. If possible, this will be sited to leave a corridor for deer movement between the remaining forest block and the Forsinain Farm perimeter deer fence to help reinstate deer access East-West in and out of the Strath. This fence will also be sited to minimise visual impact from high amenity areas along the Forsinain Trail with this depending on the boundary between the RSPB and NSCFT acquisition areas and/or the agreed location of remaining tree boundaries. Public access will be improved via the removal of some or all of existing fences and all abilities kissing gate access and forest vehicle access will be provided where the Forsinain Trail passes through the new fence. The old fence will have sections opened up to allow open deer access via robust soil sections, but will be retained until Year 10 so that we have the option of excluding deer again once regeneration control has been completed and an assessment carried out of bog vegetation recovery in relation to deer grazing/trampling. There will then be future assessments over amending deer densities through fence and culling management to maximise recovery and maintenance of bog vegetation and habitat conditions for wildlife including birds. Any culling will be carried out as part of an integrated deer management plan linked to the Management Plan on the reserve preferably by our existing deer management lessee on the adjacent open land.

In Dyke, if we acquire the whole plantation we will open up a number of sections of the old perimeter deer fence in year 2 to allow deer access for the same reasons as described above. The option to close the fence up following ongoing review of habitat recovery and seedling control will be retained, with or without deer culling to achieve restoration objectives. If continuation of arable management on part of inbye land at Dyke croft is considered desirable we would deer fence the relevant fields to exclude red deer. Consideration would be given to deer fencing remaining in-bye land along the river if domestic stock management is considered preferable to deer grazing to achieve biodiversity gains by so doing.

If NSCFT acquire a section of the Dyke plantation then discussions will take place over options for using deer (or domestic stock) to control regenerating seedlings and manage vegetation recovery. As woodland retention would be part of NSCFT plans there would have to be an additional deer fence erected to enclose their area of trees and in-bye land. This would be taken forward as a march fence between the two properties and would be additional to the costings included here with funding applied for from SRDP.

#### **4.3.6 Track/access Management**

In conjunction with other users of forest/estate tracks, we would look to carry out initial repairs in Dyke to allow full access for forest and estate management machinery and vehicles to carry out proposed management works. Maintenance in Dyke and on Forsinain access track would then continue on a user basis.

If repair of the FCS bridge at Craggy has not been carried out prior to purchase, to allow full forest vehicle/timber lorry access, this work will be carried out as part of purchase agreement with FCS. These costs could be significant and will be agreed separately with FCS as part of the acquisition process.

#### **4.4 Surveying and monitoring activities**

Surveying and monitoring of the site will be key activities of the reserve wardening staff and volunteers, RSPB experts and partner institutes. The main areas to be covered in these surveys will be:

- Tree stand and timber volume assessment
- Habitat condition, plant community and structure
- Hydrology in terms of water levels, quality and planning/maintaining damming works
- Botanical in terms of the range of plant species and their development;
- Avian surveys as birds are key components of adjacent Natura site and indicators to broad biodiversity to include repeat forest point count, post felling moorland bird survey and specific species work such as hen harrier and red-throated diver
- Tree seedling regeneration and regrowth for planning control
- Water quality monitoring by research partners to assess benefits/impacts of work on aquatic system and salmon river
- Assessment of greenhouse gas dynamics and short and long term effects and benefits of forest to bog restoration work in relation to government climate change targets
- Peat depths to assess carbon store in peat, prioritise restoration works and inform research work on green house gas fluxes.
- Collect other data via researchers as required to input to models of climate change.

The results of these surveys will be fed into the reserve's management review and will be cross referenced against other parts of the reserve.

#### **4.5 Applying and disseminating lessons learned**

Reserves biodiversity data are recorded using a database called Map Mate. These records are collated at least annually and validated by Reserves Ecology staff before upload to the RSPB's central database (Merlin).

From 2007, data are supplied annually to the National Biodiversity Network (NBN) as part of a current RSPB project to enable data to be shared with professionals, lead partner organizations and members of the public.

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Records on the NBN are publicly available, however to minimise environmental harm, records for species vulnerable to disturbance are available either at very low resolution or on a need to know basis.

In addition, ends monitoring results for species and habitats for which RSPB is the lead partner are also reported directly through BARS which includes Blanket Bog.

Forsinard Flows is recognized within the UK as having led large-scale forest to bog restoration of this kind and staff regularly advises other projects on techniques for management, planning and monitoring. Any new techniques or approaches and outputs will be disseminated to expert audiences through discussion forums, publications, talks and study meetings.

A research group involving existing and additional research partners will be developed to carry out the research work and outcomes will be disseminated by this group through expert exchange, meetings and publishing of papers on findings.

Ongoing local engagement will ensure that lessons learned are disseminated to key local contacts. Where possible educational use will be made of the lessons learned via local schools, visiting tertiary colleges, universities and expert groups such as the International Mires Group.

## 5. Project Outputs

### 5.1 Biodiversity outputs by habitat and/or species

The following table shows the approximate current situation and the potential areas of each main habitat within the project:

Habitat	Current ha	Potential ha
Non-native Conifer Forest	1149.6	0
Restoration felled conifer forest area from Life Project	225.6	0
Long term open blanket bog and associated habitats, eg wet heath	0	1375.2
Unplanted blanket bog and bog pools	296.3	296.3
Open water	3.9	3.9
Grassland/In-bye	29.6	29.6
<b>Total</b>	<b>1,705</b>	<b>1,705</b>

From the above table it can be seen that in addition to safeguarding the extent and condition of the 296.3 ha of unplanted blanket bog and bog pool systems within both blocks, an additional 1,375.2 ha of blanket bog and associated peatland habitat will be restored. The loch in Forsinain will be managed primarily for biodiversity benefit and the riverside grasslands and inbye in Dyke will be managed to reduce sward height to provide suitable feeding conditions for golden plover, dunlin curlew, snipe and lapwing.

#### Birds

In the short term management proposed will benefit breeding numbers of hen harrier, short-eared owl and hunting habitat for peregrine, merlin and golden eagle as well as greenshank, red grouse, skylark, meadow pipit, cuckoo, stonechat, teal, wigeon and potentially twite. Once blanket bog habitat and structure has been restored, there will be significant increases in numbers of golden plover, dunlin, snipe and curlew both on and adjacent to the restored blocks.

There will therefore be significant gains for a wide range of bird species many of which are specially protected species and/or included in the designated interest of the adjacent Natura sites and SSSI's.

#### Other Species

Otter and water vole will benefit directly through restoration of wetland habitat and protection of water quality in streams and river. Wildcat occur in the area and will have their foraging area significantly enhanced given that small mammals increase in the early years post felling. Atlantic Salmon will have their long-term water quality enhanced and restoration works will be carried out in a way to minimise any short-term impacts.

### 5.2 Other outputs

- Based on previous restoration works the work will create 3 skilled contractor machinery operator jobs plus 3 full time job equivalent chainsaw/brushcutter operator jobs carrying out the forestry and drain blocking works during the main activity years (Years 2 to 6). Plus 3 to 4 jobs on fence and tree regeneration control work in the other years (7 to 10).

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- A full time additional staff post requiring a qualified person will be created at Forsinard Flows Reserve.
- Create training and development opportunities in forest management, habitat restoration and conservation.
- Research work to enhance our understanding of the carbon and other ecosystem services of this restoration work will inform government policy, involve key Scottish and UK research institutions directly in Sutherland and create related local economic activity potentially including staff living in area.
- Support and development of timber transport, downstream processing and existing NSCFT enterprise including potential new jobs.
- Produce a local resource of timber including biomass for woodfuel and saw logs.
- Protect the massive peat soil carbon store surviving in these two blocks
- Increase the robustness of the carbon store and peat soils/vegetation to climate and external pressures.
- Raise awareness in the high environmental quality and approach taken by authorities and communities in North Highlands, including awareness within RSPB's one million members.
- Further develop the amenity and visitor facilities of the Forsinard Flows Nature Reserve.

## 6. Financial Summary

<b>Land Acquisition Costs and Income:</b>	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total (£k)
<b>Acquisition Costs:</b>	775	528	528								1831
Legal Fees	5										5
<b>Total</b>	<b>780</b>	<b>528</b>	<b>528</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1836</b>
<b>Income:</b>											0
Tubney Trust	258	176	176								610
other funders	?	?	?								?
RSPB	522	352	352								1226
<b>Total</b>	<b>780</b>	<b>528</b>	<b>528</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1836</b>

<b>Land Management Costs and Income:</b>	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total (£k)
<b>Land Management Costs :</b>											
Felling/Extraction/Mulch/Chip standing trees		280	280	280	280	280					1400
Control seedling regen new felling Visit 1				36	36	36	36	36			180
Control seedling regen new felling Visit 2							15	15	15	15	60
Control large regen on Life fellings		10	40								50
New Deer fence erection		14.2									14.2
Open sections in old deer fence & removal		3								31	34
Install new dams			9	9	9	9	9				45
Maintain dams						1			1		2
Track maintenance		4	1	1	1	2	1	1			11
<b>Total Land Management Costs</b>	<b>0</b>	<b>311</b>	<b>330</b>	<b>326</b>	<b>326</b>	<b>328</b>	<b>61</b>	<b>52</b>	<b>16</b>	<b>46</b>	<b>1796</b>
<b>New Staffing Costs:</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Total (£k)</b>
Staffing Costs	25	25	25	25	25	25	25	25	25	25	250
Office Costs	10	2	2	2	2	2	2	2	2	2	28
Contribution to Research Projects	5	5	5	5	5	5	5	5	5	5	50
<b>Staffing and Research Total</b>	<b>40</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>328</b>
<b>Total Land &amp; Staffing Mgmt Costs</b>	<b>40</b>	<b>343</b>	<b>362</b>	<b>358</b>	<b>358</b>	<b>360</b>	<b>93</b>	<b>84</b>	<b>48</b>	<b>78</b>	<b>2124</b>
<b>Income:</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Total (£k)</b>
Tubney Trust		42	41	41							124
SRDP		150	150	180	180	180	30	30	10	42	952
Wood Fuel and Timber Sales			50	50	50	50	50	?	?	?	250
RSPB	40	151	121	87	128	130	13	54	38	36	798
<b>Total Income</b>	<b>40</b>	<b>343</b>	<b>362</b>	<b>358</b>	<b>358</b>	<b>360</b>	<b>93</b>	<b>84</b>	<b>48</b>	<b>78</b>	<b>2124</b>

## 6.1 Assumptions Made

### *Costs:*

1. It is assumed that the land will be purchased over 3 years from 2010/11. However, assuming the application to NFLS is successful, RSPB would be keen to discuss an extension to this timescale.
2. Acquisition costs are estimates based on original DV valuations for FCS and NSCFT. They will be superseded by more recent DV instructions once available.
3. As required by FCS the above assumes that RSPB is able to acquire the full area of interest notified to FCS through the National Forest Land Scheme process. Should NSCFT acquire the areas they have notified to FCS which overlap with these areas, and over which they have first option, the above figures will be reduced for acquisition and management costs with some potential increases such as additional deer fencing requirement. Until the NSCFT acquisition boundary and success of application has been confirmed it is not however possible to quantify these changes.
4. Areas to potentially fulfil part of NSCFT timber requirements (2016 to 2019) cannot yet be identified. Volumes of saw logs are unknown and the quantity of wind firm trees in non-damaging locations is unknown. We have therefore assumed that all trees will be felled by Year 6 (2016). Once these issues have been clarified the period of felling and timber production may be extended beyond Year 6 for part of the crop.
5. Where tree size is such that there would be conservation gains from removing timber from site, but site conditions, methods or lack of markets does not allow, then additional works to reduce the brash into furrow bottoms such as de-limbing, mulching and chipping will be carried out. Costs of this work would be similar to the costs of extraction so overall costs would be similar.
6. Areas of forestry over which extraction will take place and resulting timber volumes have been estimated without full ground survey of crops, extraction routes and methods and could vary upwards or downwards.
7. As research institutes will need to propose funding bids based on an assessment of the research needs and funders objectives, as applicable to physical management works proposed, RSPB contribution costs are estimated at this stage.

### *Income:*

8. Figures assume that SRDP grant aid will be obtained for the majority of eligible costs, but not all, given the competitive nature of the scheme and the nature of the works proposed.
9. Timber income has been based on the current market value of timber, which is very low. The market has been at this level for a long time but changes could occur if local, national or import/export markets alter, with increases more likely than further decreases.
10. It has been assumed that suitable markets develop over the necessary timescale to take the volumes of timber being produced whether these are local community use, local commercial or north Scotland based where cost effective.
11. It is assumed that if required the public road infrastructure is able to carry the timber without any cost t