DUNNET FOREST MANAGEMENT PLAN

2001- 2006

Produced by the Dunnet Bay Initiative, March 2001

Executive Summary

Dunnet Forest, on the north Caithness coast, is part of the Dunnet Links National Nature Reserve. The forest is owned and currently managed by Scottish Natural Heritage, having been established by the Forestry Commission in the 1950s. Many tree species were planted, with varying success, and about half of the 103 hectare site is now occupied by high forest, the remainder being a matrix of open space, scattered clumps of trees and scrub woodland.

Extensive, publicly accessible woodland is a rarity in this part of Scotland, and the physical development of the forest has been mirrored by its growth in importance as a recreational facility. It is also heavily used as an educational resource by local schools and the Highland Council Ranger Service. Under a recent EU Objective 1 project, interpretive panels were installed, paths were upgraded to disabled specification, and a hide and large pond were created.

However, the long-term future of much of the forest is threatened: those compartments where the initial plantings were most successful are now reaching maturity and "terminal height", and windthrow has already begun to have an impact in the most vulnerable areas. Extensive intervention - clearance, felling and restocking - is deemed necessary to protect and enhance the valuable community asset that Dunnet Forest has become.

This management plan, which was produced locally by the Dunnet Bay Initiative following extensive community consultation, is designed to meet these challenges. The plan follows a conventional format: a general introduction describes the history of the site, its physical characteristics, current usage, etc. and narrates the process of community consultation which led to the creation of the plan.

Analysis and evaluation assess the strengths and weaknesses of the forest, describe the community aspirations and ideal management objectives, and clarify the constraints, physical and contractual, placed on future management. Various timescales for silvicultural intervention are discussed, and a twenty-five year plan, aimed at fulfilling the community vision for the forest is sketched out, after which the objectives and prescriptions for a five year plan are thoroughly elaborated. Amongst the key tasks of the five year plan are:

- To safeguard the long term future of the forest through silvicultural intervention in areas of highest windthrow risk: 26.75 hectares are identified for felling and restocking with a mixture of conifers and broadleaves, with a further 6.75 hectares to be carefully thinned.

- To enhance the conservation interest of the site, and enhance the structural diversity of the forest: protecting remnants of the links vegetation, creating glades and graded edges to woodland blocks, and small scale planting to maximise the diversity of the forest.

- To promote the forest as an educational and recreational resource, to be used responsibly by the wider community: repairing and maintaining fences and features funded under the Objective 1 project, developing educational usage, and zoning the forest to cater for all interested user groups.

Community management of the forest is a key part of the long-term vision, towards which this plan represents a first important step. It is the community's aspiration that this plan will provide a template for the future management of the forest, which will be successfully carried forward by locally employed and accountable personnel, and that the bold vision that informs this plan will be translated into reality.

Vision

25 years from now Dunnet Forest will be a forest managed by the community with rich and varied wildlife and a place in which to learn about, respect and enjoy the natural environment.

ACKNOWLEDGEMENTS

Dunnet Bay Initiative would like to thank all those who gave of their time and effort in the production of this plan. Many people have contributed to what marks a milestone in the life of the forest. Within DBI itself many people gave freely of their time, attending evening meetings at short notice and in all weathers. Our consultations during the production of the plan involved numerous respondents from the local area illustrating the wide interest in the forest. Their comments were gratefully received.

We would also like to thank all those who have undertaken work in the past both in the forest and in its management including people from SNH, CASE, Highland Council's Ranger Service and local contractors.

Finally we would especially like to say thank you to the team at North Highland Forest Trust for the excellent advice and to Scottish Natural Heritage for allowing us the unique opportunity to produce the plan in this way, from the grass roots, up.

Dunnet Forest by the Sea - Design by Charlotte Matthews, P5 Castletown Primary School

Our hope for the future is that all will be able to work co-operating towards conserving, sustaining and improving Dunnet Forest as the Community asset it is acknowledged to be.

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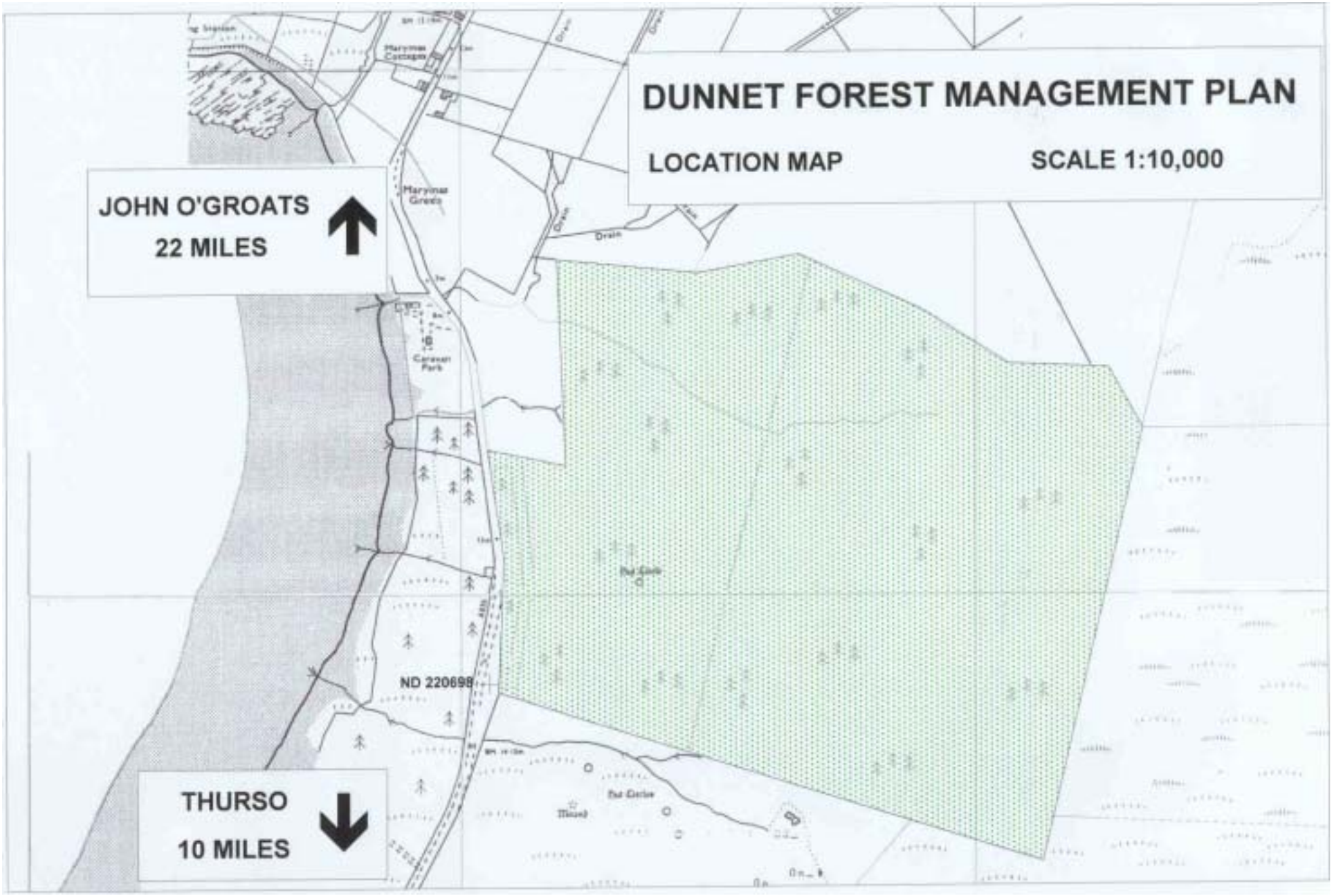

DUNNET FOREST MANAGEMENT PLAN
LOCATION MAP
SCALE 1:10,000
JOHN O'GROATS
22 MILES
THURSO
10 MILES
ND 220698
Maryinas Crofts
Drain
Caravan Park

DESCRIPTION

1.1 GENERAL

1.1.1 Grid Reference: ND222700

1.1.2 Location

Dunnet forest lies to the south of the village of Dunnet adjacent to the A836, which links Castletown and Dunnet, and its northern boundary lies 0.5km from Dunnet Bay. It is 10 miles East of Thurso and it is approximately 22 miles from the famous landmark of John O'Groats. ***See locational map***.

1.1.3 Tenure

The forest is currently owned and managed by Scottish Natural Heritage. It was originally purchased in 1954 by the Forestry Commission from Mr and Mrs Lyall of Links Farm. The Nature Conservancy Council took ownership of the forest when it bought it from the Forestry Commission in 1984.

1.1.4 Land use, past and current

Prior to planting by the Forestry Commission the land the forest is now situated on was farmland and was utilised for stock grazing. It was considered poor ground and suffered from the effects of blowouts from the dune system when significant quantities of sand were blown inland and dumped on the pasture.

The Forestry Commission undertook the planting of it as an experiment into silviculture on poor soils in the hope it may make a financial return. Planting began in 1954 and initially there were plans to grow trees south over a larger area through the three links of Dunnet, Greenland and Old Tain.

It has developed into mature forest, which in areas has failed and in others is relatively successful although the timber present is generally of poor form. The forest is currently used as a recreational, educational and interpretive resource by the local community, Scottish Natural Heritage and other organisations, e.g., Highland Council's Ranger Service.

Although many tree species were planted initially it is now dominated by Sitka spruce and lodgepole pine with a few native and broadleaf species some of which were planted at a later date. For full list of tree species planted ***see Appendices 1 and 2***.

SNH have managed the forest for its conservation value as there are remnants of the links vegetation in the wider rides. Public access to the area is permitted and actively promoted on site. More recently funding has been obtained from SNH ERDF & CASE to upgrade paths to disabled specification, add a hide and large pond and plant broadleaves. During this time there was consultation with the community in the form of public meetings and two management plans were produced, one on the silvicultural aspects of the forest the other on the environmental, educational and recreational opportunities.

1.1.5 Neighbouring land use

The land surrounding the forest is owned by four different landowners. Land uses are predominantly agricultural focusing on stock rearing and sheep. A sand quarry is in operation about 2km east of the forest. None of the uses impact on the forest apart from occasional entry by sheep.

1.1.6 Wayleaves

A number of wayleaves affect the site. These are, North of Scotland Hydro Board, which consist of a line of hydro wires traversing the site through the northern extreme of the forest in compartments 1 and 2, British Telecom, HRC Dept of roads and transport and HRC Dept of Water and sewerage. ***See compartment map.***

1.1.7 Designation/Special areas

The forest is situated on ground that is part of the Dunnet links NNR. The site does not meet current criteria for the selection of NNRs and it is expected that the NNR designation will be removed in 2001. It is still part of a SSSI. The SSSI notification is for coastal dune vegetation communities associated with calcareous sands including notable populations of *Primula scotica*.

1.2 PHYSICAL

1.2.1 Size

Dunnet Forest is approximately 103 ha in size. However, high forest cover is only present over approx. 49ha the remainder of which is either low stocking density, scrub, open ground, standing water, car parking and wayleaves.

1.2.2 Topography and landform

The forest itself is uniformly flat with little in the way of distinct topographical features. It is situated within a flat (in places very gently undulating) landscape. It is just over 10m above sea level at its lowest point rising to nearly 40m at its highest point. A number of burns traverse the site from East to West, which have cut relatively deep channels through the forest.

1.2.3 Geology

Base geology is Middle Old Red Sandstone type of the Caithness flagstone series. The drift geology over most of the site consists of either shallow layers of peat, small areas of boulder clay especially near burns where it is occasionally exposed. These drift materials isolate the sandstone from weathering and contribute to the soil structure.

1.2.4 Soils

The majority of the soils are in the Whitelinks series and the Fraserburgh association, previously described in Aberdeenshire (Glenworth and Muir, 1963) and in East Lothian (Ragg and Futty, 1967) *The soils of the country around Wick.* They are poorly drained calcareous ground - water gleys which frequently develop on the flat areas between fixed dunes. “Impeded drainage is attributed to a buried layer of peat and/or glacial till at depths ranging from 40cm to 1m.”, *Dunnet Links SSSI Management Plan, compiled by Stan Whitaker, 1995.* The soil type therefore behaves like and is classified as a ground - water gley.

The pH of the soil is a direct result of calcium rich shell sand deposits and the rate at which calcium carbonate is leached. Therefore the greater the distance from the dunes, the less sand and therefore calcium carbonate there is being deposited, balanced with approximately the same amount of leaching. The pH therefore reduces as the distance inland from the dunes increases. *Pizzey, 1974*, measures a pH of 5.5 in Dunnet Forest. However it is likely that this is both a significant distance from the dunes and may well have been taken from a sample including a large degree of mor humus. Bearing in mind that the forest reaches over 1400m inland, *Futty and Dry, 1977* recorded pH values of 7.6 and 6.3 on the Whitelinks series at distances of 400m and 3km inland respectively. Because the soil is so heavily leached it has a limited buffering capacity.

The upper 20cm or so of the soil is free draining but because of seasonal water logging due to the presence of a peat layer deeper in the profile, rooting depth is limited to 30cm beyond which root growth is restricted. *See soil pit photos.* There is a mor humus layer mainly composed of partly decomposed needle litter.

1.2.5 Climate

A detailed description of climate is available in *Dunnet Links SSSI Management Plan 01/05/95 to 01/05/99, compiled by Stan Whitaker, 1995* which has been derived from the meteorological office

weather station at Wick and *Futty and Dry, 1977*. The most important factors affecting tree growth and performance have been summarised below using this information.

1.2.5.1 Rainfall

Rainfall is recorded (derived from data sets obtained during the period 1941 – 1970) as being between 800 & 850mm. Distribution at Dunnet is relatively even throughout the year with October and November recorded as the wettest months and May as the driest.

1.2.5.2 Temperature

The annual range in mean monthly temperatures in the area is low which reflects the oceanic influence and illustrates more stable values relative to areas further inland and south. Averaged temperature records from the Wick met office station record max mean monthly temps of;
12.9 degrees Celsius – July
3.4 degrees Celsius – January
which gives an annual range in mean monthly temperature of 9.5 degrees Celsius.

1.2.5.3 Wind

According to *Futty and Dry, 1977*, gale force winds are experienced on average 12 days p.a. The prevailing winds are south-easterly but north-westerlies occur for significant periods in the year. An analysis of the windiness of the site using the Forestry Commission's wind risk model for British Forests, ForestGales, has also been undertaken, ***see ForestGales Analysis.***

1.2.5.4 Moisture deficit

The site lies within a rainfall zone with a moisture deficit of 131mm per annum according to an initial Ecological Site Classification Analysis (ESC) analysis. Met office data quoted in the *Dunnet Links SSSI Management Plan, compiled by Stan Whitaker, 1995* puts the deficit figure at 72mm. However this data relates to Wick and while the information should be broadly similar for Dunnet the data sets cited are older than those used in ESC.

1.2.5.5 Summary

By implication from the data provided above and using description of bioclimatic regions the area experiences, "an extremely oceanic climate with a relatively low annual potential water deficit and fairly warm temperatures", *Dunnet Links SSSI Management Plan 01/05/95 to 01/05/99, compiled by Stan Whitaker, 1995*.

1.2.6 Forest Ecology

The main habitats present are Coniferous woodland and grassland. The coniferous woodland is dominated by stands of Lodgepole Pine with smaller stands of Sitka Spruce, Corsican Pine and Mountain Pine. The Lodgepole Pine and Sitka Spruce have performed relatively well in comparison to the Corsican Pine and the mountain Pine has a naturally bushy habit and will never achieve a significant top height.

The majority of the stands of Lodgepole Pine and Sitka Spruce have not been thinned since planting on a 1.5 – 1.8m spacing. However a small number of areas have been thinned to encourage a more diverse ground flora including some line thinning in compartment 1. Details of implementation are found in *Dunnet Links SSSI Management Plan 01/05/95 to 01/05/99, compiled by Stan Whitaker, 1995.* In some of these areas where the thinning has created small glades the ground vegetation has responded favourably. This however has not occurred where line thinning has been implemented. Canopy closure is complete except for one or two smaller areas, which are the exception creating a dark and relatively bare forest floor. However there are patches of significant bryophyte cover.

Because of the extensive path and ride system throughout the forest in addition to areas of failed planting and glades there is a significant amount of forest edge habitat. Where the original plantings have failed the sub compartments consist of open areas with scattered trees amongst them creating a

marked difference from both completely open ground and completely closed canopy high forest. This adds structural diversity to the forest.

1.2.7 Grassland

The grassland habitat within the forest is composed of three sub types and is well described in, *Mitchell I. Baseline vegetation survey (1983)* for Dunnet links. The three sub types are;

Species rich short turf
Ammophila dune grassland
Species-poor "rank" grassland

The Scottish Primrose is found in places throughout the site which used to be part of the extensive dune systems that remain a dominant feature of Dunnet Bay. The areas of species rich grassland are found more commonly out with the forest canopy and are quite often in a mosaic with the other grassland types especially Ammophila grassland. It is the species rich turf that is of highest conservation interest on the site and is the reason why the forest qualifies for its SSSI status.

The species poor or rank grassland is found most commonly where the coniferous plantation has failed and is dominated by Wavy Hair Grass, Yorkshire Fog, common nettle, and yarrow. Other habitats include the man-made pond and species rich tall herb fen with Flag Iris. Native broadleaved trees have been planted around the pond area and are performing well. A more fertile soil is present here and the open canopy allows a high degree of light to reach the ground.

1.2.8 Wildlife

The forest supports a significant amount of wildlife including foxes, roe deer, rabbits, stoat, weasel and small mammals. The pond attracts amphibians such as frog, toad and palmate newt and damsel and dragon flies such as the large red the common blue and the blue tipped damselflies. There is evidence of otter in the form of spraint marks and predated frogs and toads and one has been seen from the hide very occasionally.

The forest rides and clearings have provided much needed shelter for a diversity of butterflies and feeding is provided by the vetches. violets and cuckoo flower growing here. The main species found are small blue, common blue, green veined white, dark green fritillary and meadow brown.
The conifer forest has a number of associated species including, coal tit, gold crest, cross bill and chaffinch. In the past Hen Harrier have been noted in the more open parts of the forest.

See appendices 1 - 4 for species lists.

1.2.9 Timber value

The current economic timber value is low. Chip wood from the site is likely to attract only £1 – £2 per ton standing. The haulage cost from Caithness to the main mills (Dalcross, Dingwall etc) is currently £10 per ton. Not only is the forest dominated by what is classed as chip wood, presently with a very low market value, it is also a long way from the nearest commercial market. Therefore transport costs place a significant burden on what is already a poor value crop, which makes it uneconomic to extract as a commercial proposition. However, timber prices at roadside could be negotiated to make the situation look very different. Saw logs are currently realising £30 per ton, pallet wood £21 per ton, slats £23 per ton and pulp/small roundwood £17 per ton, delivered to the mill. This gives an indication as to how prices could be negotiated following a subsidised or low-tech extraction.

1.3 ACCESS AND RECREATION

1.3.1 Past use

In 1932/3 the Dunnet Hotel was purchased by James Wilson, who ran the hotel and the farm associated with it. Part of the grazings south of Maori Ha' (219709) was laid out by James Braid as a nine hole golf course. Braid was so taken with the links that he wanted to extend the course to eighteen holes but, with the outbreak of hostilities, this scheme was abandoned. The hotel, which had changed its name to the Golf Links Hotel in 1933, was requisitioned as an Officers Mess by the RAF, which had built an aerodrome at Thurdistoft. The golf course was once again used for grazing purposes. Approximately the most northern half of the present forest was a part of this course along with what currently is the outrun for Links Farm. After the war, the hotel changed hands but the farm remained with James Wilson. Because the golf course was no longer playable the new hotelier changed the name of the hotel to The Northern Sands Hotel.

1.3.2 Road

Road access is good with the main A836 passing right by the entrance to the wood linking the woodland via Thurso to the A9 South. The A836 is a trunk road and continues on to the harbour town of Wick, with access routes off to Dunnet Head, John O'Groats and Duncansby Head. The road is de-restricted.

1.3.3 Pedestrian

Pedestrian access to the forest is from the A836 Thurso to John O'Groats road at two points. The main access is at the car park at the south end of the Dyke o' 'e Links (map reference -220698). The other access at the west end of the west to east ride, which bisects the forest (221703). Prior to 1984, when the Nature Conservancy Council acquired the forest from the Forestry Commission, access for the public was not encouraged. It is only in the last sixteen years that there has been a greater use by the public, be it local or visiting tourist, and the number of people now regularly enjoying use of the woodland environment has grown considerably from the 3000 per annum estimated by Ian MacLennan in his 1990 Review. A conservative estimate for present visitor numbers may well be three times this figure.

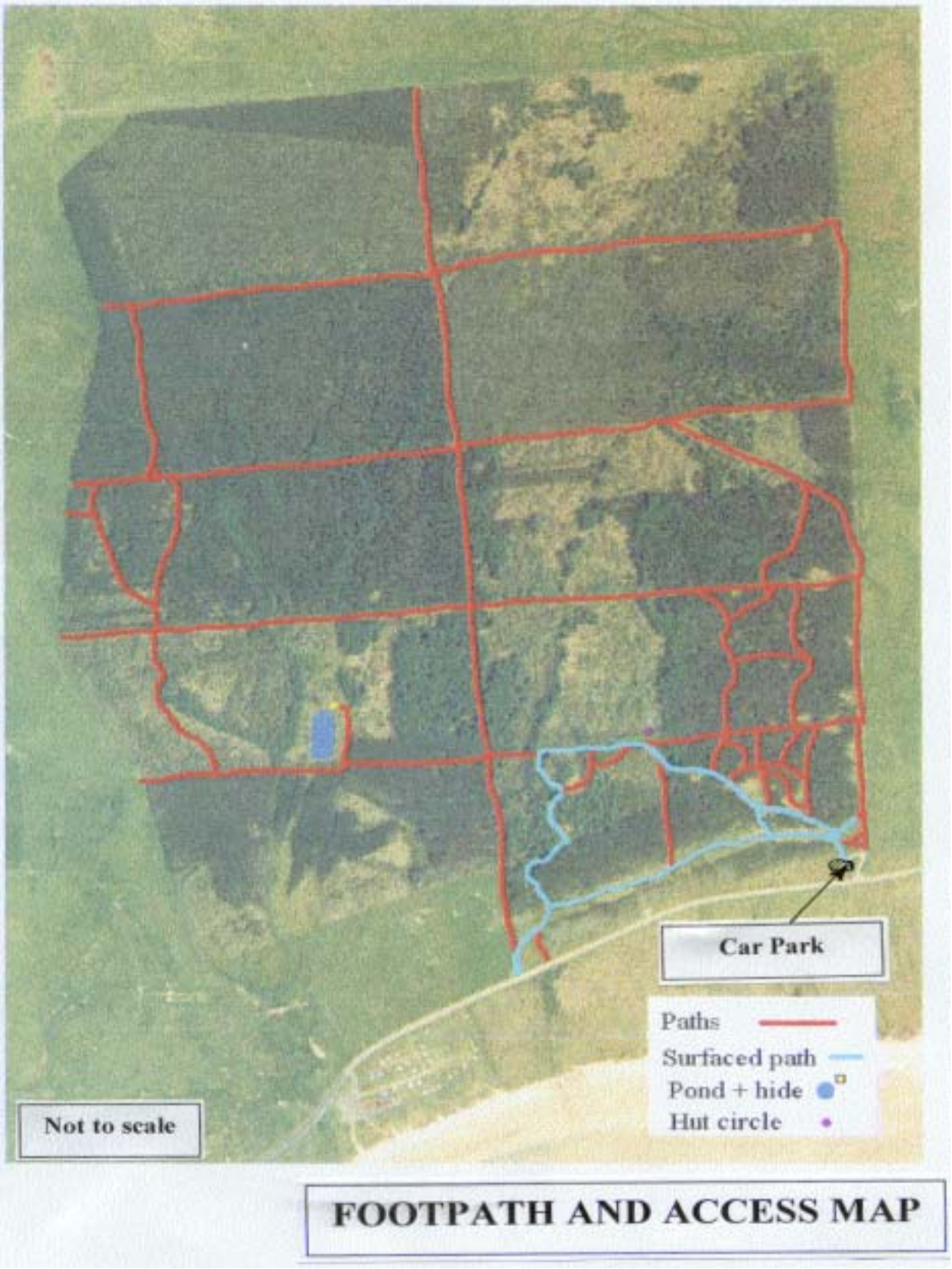
The largest recreational group are walkers many of whom have dogs with them. They come mainly from the locality and as far afield as Thurso and Wick. A people counter was set up on a footpath near the entrance to the forest. Three thousand were counted in a year, which seems to be an underestimate and since the upgrading of paths and car park there has been an increase in usage with the car park reaching saturation point. A small section of grass verge at the northern end of the forest is sometimes used as a parking area.

Walkers are concentrated in the area that covers the southern half of the forest but some do use the further corners of the site. Since the hard surfaced path was put in there are more families with young children using it. In the summer months tourists also walk there but their numbers are low proportionally. The high numbers of flies (July & August) and ticks also tends to keep people away at that time

1.3.4 Equestrian

Horses were occasionally seen in the forest about 7 years ago; since the improvements they are no longer seen. There is no physical barrier at the entrance to prevent horses or bicycles getting in. This is a very contentious issue. There has been little access to equestrians as the advice given by foresters, at both previous public meetings held in Dunnet Hall to discuss management plans, was to dissuade and not encourage access for horses. Paths would not stand up to horses hooves and it is possible trees would be damaged. It is an issue that may need strictly limited access to be addressed. It is not considered by many of the public to be a priority.

DUNNET FOREST



FOOTPATH AND ACCESS MAP

1.3.5 Car Parking

A small surfaced car park is within the site boundary. There is enough room for approximately 18 cars. The car park tends to become busy and occasionally full in mid-summer especially during holidays and Sundays.

1.3.6 Track

There is surfaced path more akin to a track for all abilities leading from the main car park in a short trail (1000m) around the north end of the forest. This is well used by all abilities.

1.3.7 Perimeter fences

The forest is enclosed within a post and wire fence and in places old drystone dykes are present behind the fence line. See boundary map. The fences have been erected to keep stock out of the forest and on the neighbouring farmland. Typically they consist of a stock fence with one roll of rylock and one top line of barbed wire. Rabbit netting is also present along the eastern and northern boundaries.

Some of the fencing requires repair/renewal to remain stock proof. The southern boundary fence is in the best condition with both eastern and northern edges requiring relatively urgent attention.

1.3.8 Footpaths and rides

The forest is well provided for with a comprehensive network of tracks, footpaths and rides. *See footpath and access map*. Many of these originate from the original track layout, which was to facilitate the planting, management and eventual extraction of the trees. However a significant network of more informal paths have been created, some it appears almost by default i.e., desire lines and others in a more structured way as part of a funding package with specific outputs, e.g., ERDF/Objective 1 funding project. The original track layout is highly regular based on a grid pattern effectively slicing the forest up into rectangular shaped plots.

1.3.9 Other, e.g., bicycles

Cyclists do use the forest paths but there is no recognised facility and none of the tracks, paths or rides are way-marked specifically for cyclists to use. Many of the footpaths are narrow which means bicycles and people can only pass with difficulty. However for reasons related to the intrinsic value of the forest, i.e., a sheltered wooded environment, this recreational use is likely to continue to be a very contentious issue. Many walkers have expressed the wish that no bikes should be allowed in the forest.

1.3.10 Facilities/events

The Ranger Service runs a wide variety of events in the forest, e.g., treasure hunts, “Cone Zone.” In addition the athletics club runs an annual “hash” on Boxing Day. Church summer schools and playgroups also organise independent outings and day trips. There are a few modest facilities within the forest including a well surfaced, all ability track which extends for approximately 1 km in a circular route through the western portion of the forest. There are limited seats and tables for picnickers. A wetland area with a hide has been created by damming the flow of water downhill in an open area of the forest and well away from the ponds, which were originally dug to hold water in case of fire. Within, the hide interior is spartan but there is some pictorial interpretation of what bird/animal life may be seen in this area.

The entry from the car park has an interpretive panel and welcome, erected by SNH.

1.3.11 Conflicts

There is a conflict of opinions about the forest. While the orienteers for example would like to create more new paths, many of the public who walk daily or regularly in the forest, feel that there are already sufficient pathways. There is a strongly held view that the forest should not change overmuch – that the wilderness areas should be retained so that wildlife will continue to have a safe and secure area in which to thrive. Others express contrary views wishing more signposting in case of fire. Most seem to

think that signposting should be minimal. One of the beauties of the forest is its naturalness which would be diminished by too many signs. Interpretative panels may be desirable but they can be suitably designed and sited within the natural habitat.

The most contentious conflicts are, and will continue to be, with minority groups such as Equestrians and Mountain-bikers until access for them is properly addressed and an agreed solution is acceptable to the majority. This will not happen overnight.
At present conflicts are more perceived than actual, however conflicts are present and are summarised below;

- between cyclists and walkers.
- Campers conflict between conservation aims and safety.
- Conflict about any changes to forest.
- Conflict due to disruption,
- Conflicts due to different wish lists.
- Conflict between human and wildlife demands. i.e. aesthetics and cover (removal of brashing & fallen timber (perceived as untidy))
- Probable increased Disturbance

1.4 INTERPRETATION/EDUCATION

1.4.1 Facilities/events

The forest is heavily used as an educational resource by local schools working in conjunction with SNH and/or the Highland Council's Ranger Service. "It is one of only three wooded areas in Caithness formally open to the public and represents one of the most mature woodland habitats in the area" *Maclennan I. Dunnet Forest, Review of Environmental, Educational and Recreational Opportunities, 1990.* During the last Objective 1 project, interpretation in the form of panels was set up, focusing on the history and natural history of the forest. In addition a flagstone plinth was used for the interpretation of the hut circle within the forest boundaries.

The entry from the car park has an interpretive panel and welcome, in both Gaelic and English erected by SNH. The other interpretation within the forest is a Caithness flagstone monolith near the site of a hut circle. A self-guided leaflet was also produced by SNH focusing on the wildlife of the area around the surfaced path. Interpretation is also carried out by the Ranger Service who lead guided walks there.

A draft environmental education plan has been drawn up focusing on Dunnet forest and involving the Ranger Service and S.N.H.

1.4.2 Links

There are strong links with and created by the forest in this capacity. Both primary and secondary schools visit the forest for environmental education usually accompanied by a ranger but occasionally independently. The number of school children is over 400 and they tend to be there within the summer months. Youth groups also use the area often for environmental studies. The forest also forms a catalyst between Highland Council's Ranger Service, SNH and the local schools through a draft environmental education plan, which has been drawn up focusing on Dunnet forest and involving the Ranger Service and S.N.H.

1.4.3 Conflicts

Few of the conflicts identified under Access and Recreation are applicable here. As current interpretative facilities are largely passive there is little scope for conflict between this and other facilities. Similarly while education mainly takes the form of Ranger Service guided activities, the scope for conflicts occurring between for example schoolchildren and orienteering interests will be limited because of the provision of a responsible person (Ranger) who understands the needs and requirements of both user groups. Conflicts are more likely to occur between a user group undertaking an educational or interpretative activity and a recreational user when neither of the groups concerned is being supervised.

CAR PARKING

Car parking is currently limited and on busy summer days this car park (Western entrance) can become congested. It is maintained by infilling pot holes with chippings. There have been some suggestions for extending and resurfacing the area with tarmacadam.

INTERPRETIVE/EDUCATIONAL FACILITIES

This decking and small wetland was created as part of the Objective 1 funding bid. It is an important resource for all ability pond-dipping activities. More planting of shrubs around the feature would provide a greater degree of shelter and enhance the wildlife value.

INTERPRETATION OF THE FOREST

Fixed interpretation in the forest was funded under an Objective 1 bid and includes boards, a stone plaque and wooden signs. This board interprets the importance of open areas as glades for flowers and invertebrates.

THE BIRD HIDE

Interpretation and information within the hide is currently limited and there is a desire for this to be improved with more information relating to the wetland/pond with the possibility of something which relates directly to what the visitor sees when looking out of the hide.

1.5 COMMUNITY

1.5.1 Community interest

Interest in Dunnet Forest is widespread over the northeast of the County and extends well beyond the villages of Castletown and Dunnet. The reasons for interest vary widely but it is for most a place of interest, peace and solitude where children can be taken with freedom to roam and pretend; where the elderly can walk in safety to enjoy the quiet shelter; where dog-walkers may exercise their pets with freedom, and where all can enjoy the forest.

It is used by people from Thurso and environs, as evidenced by the numerous cars, which regularly fill the car park. Therefore the community in this sense is both a community of interest, the interest being the forest itself and the community defined by geographical location, i.e., the more immediate resident community.

1.5.2 Past use

Community use is akin to the uses made of the forest by those undertaking informal access and recreation. *See Access and Recreation*. Little use has been made by community groups on a more formal basis but nonetheless the forest is viewed very much as an open and free resource for all members of the community to use at their leisure.

1.5.3 Current use

It is principally used by walkers, dog-walkers, visiting educational groups, a few cyclists and runners. Representatives of each of these user groups are present within the immediate community as well as the towns of Thurso and Wick.

Significant use is made of the forest by the local schools especially, Castletown Primary and Crossroads Primary. Schools are pivotal nodes of any community providing the important overlap of children and adults and represent significant potential for enhanced community involvement and use in the future.

1.6 CONSULTATION

There have been two consultative meetings in the past, both held in Dunnet Hall. The idea of the meetings was to obtain views from the community on their aspirations for the future management of the forest and to gather support for any proposals produced by subsequent contractors.

Each meeting was well attended by people with widely varying interests in Dunnet Forest. Each meeting had experts on forestry advising as to what could be viable and what would be inadvisable. Management plans were promised for the future management of the woodland but the brief and structure for the plans were not discussed with the community.

The first meeting took place following the production of a report by Fountain Forestry which focused on the commercial potential of the forest. The second meeting came after a review of Environmental, Educational and Recreational Opportunities at Dunnet Forest was published by Ian MacLennan Forestry in 1990. *Maclennan I. Dunnet Forest, Review of Environmental, Educational and Recreational Opportunities, 1990.* Views expressed by the community were incorporated into a European funded project to improve access, interpretation and wildlife habitats.

SNH undertook further consultation with the Dunnet Forest sub group in 1999 in order to obtain views on the production of a further plan which would determine and consider community views and aspirations toward the future management of the forest against the background of the silvicultural constraints placed on the forest by local bio climatic and bio geographic conditions. It was envisaged that the community would have a significant input to the plan in the hope the ties and links with the forest would be enhanced and the future management decided on in partnership with SNH rather than either group working in isolation of the other.

Following an initial meeting where the community decided to make use of the local Forest Trust (NHFT) a brief for the management plan was prepared by SNH and comments were invited from both NHFT and the Dunnet Forest sub group. At a subsequent meeting it was agreed the community would take ownership of the plan by drawing on their own knowledge and skills, utilising the skills of NHFT for elements of the plan and producing a working document which encompassed the views and obligations (as a government agency) of SNH.

As part of this process consultation within the group as well as out with the group including people in the neighbouring villages and towns was essential. The various stages of consultation were undertaken in the following order;

- Meeting between NHFT and Dunnet Forest sub-group to agree consultation procedures and a plan of action for undertaking the preparation of the draft plan.
- Informal consultation between members of Dunnet Forest sub-group and NHFT, both home and work visits as well as telephone calls.
- Site visit organised by HC Ranger Service and attended by NHFT forester and Dunnet Forest sub-group.
- Forest for Real exercise advertised in local press and comments invited at HC Ranger Service base.
- Continued informal consultation by telephone undertaken by North Highland Forest Trust.
- Users of the forests consulted informally on site by the HC Ranger Service.

The Forests for Real exercise consisted of members of the public being invited to place their comments on yellow “post its” and sticking them to an aerial photograph of the forest. The results of this consultation exercise centre mainly on recreational, educational and interpretative aspects of the forests management.

1.6.1 Results of the Forest For Real Consultation

- More benches around for the less able to rest at. (Exact location unspecified) *x3*
- Cycles be excluded – *x3*
- Existing tree debris; this is becoming very considerable & detracting from the surroundings. Some needs to be retained for wildlife but there should be a good clear out of the rest. Perhaps it could be used as a wind break.
- Pond; Enlarge this, soften the edges, more hides. Seated areas in hide for the less mobile.
- Existing parking area; as the car park area is limited erect suitable sized notice board to indicate that parking is available at the north end of beach.
- Do as little as possible
- No more paths but keep existing paths clear
- Plant new trees of a variety and let nature do the rest.
- Mountain biking
- A contentious issue and needs to be resolved to prevent irritation to pedestrians, avoid the need of policing and give (especially children) a safe place to exercise.
  Possibly designate a specific area (agreed by all parties) where pedestrians should "take care" because cyclists could also be using these particular paths. Simple signage round the forest and a code of conduct/notice/leaflet should help the situation.
- Orienteering course. /courses suitable for all ages.
- Record wildlife that uses the forest / pond area over a couple of days and show the film in the display.
- No more paths
- Dog mess; Set up an entrance as a dog toilet area
- More dog bins within the forest
- Reluctant to make it a biking area except for young children
- Some information on plant life
- I think there has been excessive clearing of undergrowth allowing access to unmarked areas and leading to a multiplicity of paths.
- Opening up, thinning, of eastern block has led to wind damage.
- Open up new path in the remotest north-eastern block.
- Police area better for people using air guns
- Make a charge for entrance to the forest (annual Sub) and plough money back into the upkeep.
- As far as is possible keep the nature of the forest as it is.
- Block off some of the paths in the area nearest the road to allow mosses and vegetation to recover (dog damage) and reduce disturbance.
- Leave the remotest area undisturbed.

In summary there appears to be a wish for
- as little change as is possible.
- A wish for no more paths except for one group.

1.6.2 Relationships between stakeholders

There is no contractual arrangement between Dunnet Forest sub group or Dunnet Bay Initiative and SNH for the management of the forest. However a contract between DBI and SNH exists for the production of this management plan for which a sum of money will be paid to DBI. DBI has therefore become a contractor to SNH to fulfil this role. This is the first time in the north highlands that such an arrangement has been facilitated between a community group and a government agency. NHFT has been asked to undertake certain elements of the plan relating to the management of the forest by DBI and to assist with the consultation phase.

NHFT is core funded by CASE, RACE, SNH and the Leader 2 programme. Help in kind is supplied by the Forestry Commission. The assistance NHFT is able to offer in this situation goes part way in fulfilling SNH's strategic aims and represents the funding assistance given to NHFT by SNH. One member of DBI is employed by HC as the local Countryside Ranger who have permitted her to spend time working on the plan free of charge to DBI.

1.7 MANAGEMENT RESOURCES

1.7.1 Financial

At present the Dunnet Forest Steering Group has no finance other than that given by SNH to the group expressly to formulate a management plan for the next twenty-five years. However the group is involved in an environmental scheme funded by Entrust/Highland Council, which should make an initial contribution. This is involvement in the Dunnet Beach Clean (Winter) and could be ongoing. In the past Objective 1, LEC, Highland Council and SNH funding has been secured for project based activities but historically there has never been a need to raise core funds.

1.7.2 Labour

SNH employs a forestry contractor currently involved on an equivalent of two days per month to do maintenance within the forest. Management of the forest dictates that more tasks need to be undertaken that can currently be provided for by the present amount of inputs.

Management has been undertaken in the past by a contractor who was employed on a part-time basis for two years. This was primarily to maintain the Objective 1 areas and to keep the forest tracks open for visitor access. It is considered by DBI important to seek funding that may allow a full-time employee to be in place. If such a situation can be achieved then his/her daily presence supported by the Ranger and group members could have a marked effect. The Ranger is employed with the forest being part of her remit, which is mainly educational and environmental.

1.7.3 Volunteers

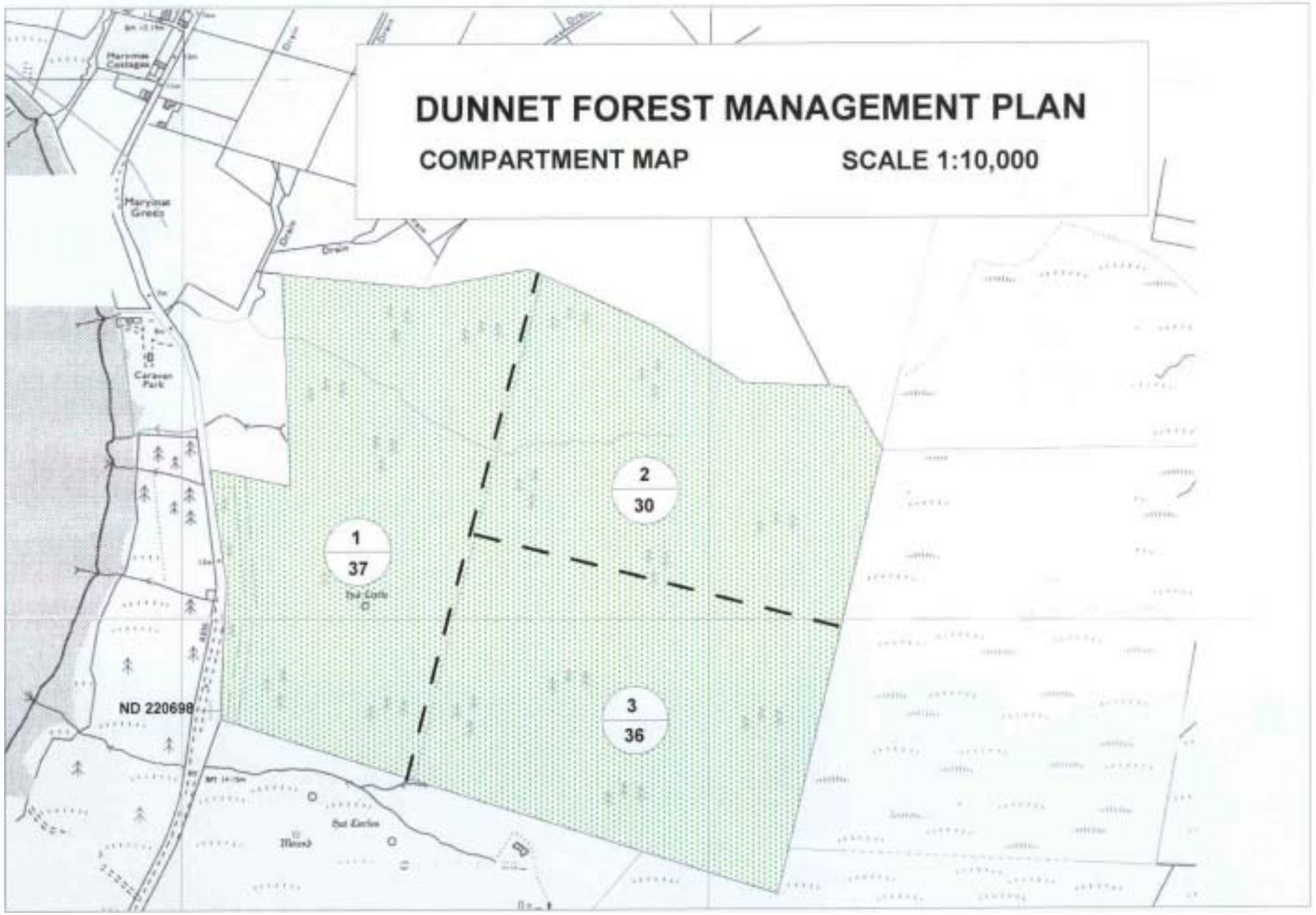
In the past volunteers have been used for a variety of activities from building and putting up nest boxes to planting trees and putting wire on the boardwalk. The volunteers have come from schools, youth groups, Community Service and the Caithness & Sutherland Volunteers. Maintenance is also carried out by the Ranger Service as is the job of emptying the dog bin.

Since the Dunnet Forest sub-group started on the consultation concerned with the future management of the forest a number of volunteers have indicated their willingness to be involved with the Steering Group or to help in whatever practical way possible.

1.7.4 Organisations

As owners, SNH have an obligation to manage the forest in a way that meets their strategic aims. In this instance there is a desire that this management be undertaken in partnership with DBI in order both the communities aspirations and SNH's strategic aims be fulfilled simultaneously. A relationship of this kind also enables funding to be secured by an independent organisation (DBI) otherwise unavailable to SNH. Therefore it is likely that significant financial resources could be available for the sustainable management of the forest from outwith SNH's funds.

Both organisations are able to draw on a number of sources for management advice and expertise (NHFT, HC, FC etc) enabling any funds raised to effectively go further. A variety of practical management tasks will need to be undertaken whichever form of management is decided on. It is extremely likely that the private sector either in the form of management companies or forestry contractors or both will be employed at some stage. The relationship between SNH and DBI and their ability to raise financial support for management will therefore provide work and help the forest and local economy.


DUNNET FOREST MANAGEMENT PLAN
COMPARTMENT MAP
SCALE 1:10,000
Caravan Park
2
30
1
37
3
36
ND 220698

1.8 COMPARTMENTS

For ease of description and subsequent management the forest has been divided into three compartments *see compartment map*. These are based on the report produced by Fountain Forestry in 1996. The general descriptions of these compartments have also been used as they fit well with the issues and factors that need to be addressed before undertaking any physical forest management. The compartments have been described using factors, which will have a direct bearing on both their management and the physical constraints.

1.8.1 Compartment 1

1.8.1.1 Size

37ha

1.8.1.2 Forest Type

Plantation, high forest. This compartment includes the shelterbelt planted to protect the forest from gales along its western boundary. This largely consists of Mountain Pine with some broadleaves, e.g., Sycamore. In places it has died and now offers little or no protection from westerly and north-westerly gales, especially at the northern end.

1.8.1.3 Soil

The soil mainly consists of a shallow mor humus overlying sand. *See soil description and soil pit photos.* The soil is classified as a ground water gley.

1.8.1.4 Rooting depth

The rooting depth is limited, averaging 20cm. This is mainly due to seasonal water logging resulting from a high water table. This has the effect of creating anaerobic conditions for extended periods within the year thus killing roots.

1.8.1.5 Tree species

This is the most diverse compartment in terms of its tree species composition including Lodgepole Pine of southern origin, Corsican Pine, Sitka Spruce, Austrian Pine and Mountain Pine. Other species present in varying amounts include Larch, Sycamore, Rowan, Willow, and Birch. The majority of the Larch and Sycamore is mature but has failed to produce trees of good timber form. The matrix species is Lodgepole Pine with Sitka Spruce, Corsican Pine and Mountain Pine occurring in distinct stands within the matrix. Very little planting has been undertaken in an intimate mixture.

1.8.1.6 Overall timber value

The overall timber value is poor, although there are areas of forest and individual stands (e.g., Sitka Spruce stands) which are of higher value and would realise a return in a conventional market. Current market values for chipwood are £1-£2 per ton. Transportation costs are currently £10 per ton. The nearest wholesale market is Norboard, a distance of approximately 140 miles. Smaller mills closer than Inverness may be more profitable, if only in respect of transport costs being lower.

1.8.1.7 Top Heights

Top heights range from 37 to 62 feet, the average for the matrix species being 45.6 feet (13.8m).

1.8.1.8 Diameter at breast height

Dbh values from the sample plots used range from 18 to 32cm giving an average dbh value for the matrix species of 25.3.

1.8.1.9 Volume

The mean volume lies somewhere between 244 and 293m^3 per ha measured as those areas where the plantation has closed canopy. These calculations do not include the volume per ha of the failed areas and areas where the trees are presently on a much wider spacing. Calculated using Yield modelling tables in FC's Yield models for forest management. The result is approximate because the standard top heights and dbh given for any one age class do not match the data for the trees at Dunnet. This is because the crop has generally under performed in terms of top height but has over performed in terms of girth. It is also worth noting that the tables used are notorious generalisations and could well be inaccurate in this case. A more accurate way of calculating volume will be to undertake a comprehensive sampling strategy using Procedure 9 (Inventory Valuation) or Procedure 8 (Sale) in FC booklet 39 prior to felling operations.

1.8.1.10 Yield Class

Yield class 8* Calculated as General Yield Class (GYC).

1.8.1.11 DAMS – windiness

DAMS scores for this area using FC's modelling (to a resolution of 50m^2) are 15. This has been calculated using the grid reference methodology and not by topex. The likely return period for a damaging gale (uprooting) is 200 years at this moment in time. The average return period for a damaging gale (snapping) is 200 years. However using modelling techniques (ForestGales Analysis this is set to drop drastically to 0 years over the next few years. *See ForestGales analysis.* Some of the compartment is either at or approaching critical height, i.e., 3% of it is prone to and is currently experiencing wind throw. Much of the compartment is approaching terminal height, i.e., it is very likely to blow over in the near future.

1.8.1.12 Recreation

Recreational facilities within this compartment include footpaths both surfaced and un-surfaced. The surfaced path allows access for wheelchair users. Areas of boardwalk allow access over particularly boggy and sensitive stretches of path. Cycling albeit informally, currently takes place in this compartment along with Ranger Service guided walks and orienteering organised by the local orienteering club. An all ability picnic table is provided in this compartment.

1.8.1.13 Interpretation

All of the sites' fixed interpretive facilities are found in this compartment. These include: site welcome and introduction, nature trail interpretive boards, archaeological interpretation, site management interpretation and a wildlife hide.

1.8.1.14 Access

Access is good and based on the existing ride and track system originally put in place for the management of the forest. This network allows for circular walks around the forest blocks but also creates wind funnels along which the wind is allowed to accelerate. The linear nature of most of the paths throughout the forest allows little scope for surprise although does create some interesting vistas in some places. In this compartment however some of the paths are not so linear in nature, which provides more of an interesting and potentially more enjoyable experience. This compartment includes the existing all ability access track put in with the help of Objective 1 funding. Boardwalks and bridges traverse burns and boggy ground.

1.8.2 Compartment 2

1.8.2.1 Size

30ha

1.8.2.2 Forest Type

High forest, plantation origin.

1.8.2.3 Soil

Mainly overblown sand. Needle litter has resulted in a mor humus overlying the sand. The soil is classified as a groundwater gley. *See soil description and soil pit photos.*

1.8.2.4 Rooting depth

Variable but averaging 25-30cm

1.8.2.5 Tree species

A large number of species, however dominant matrix species is Lodgepole Pine. Stands of Corsican Pine, Mountain Pine and Sitka Spruce occur distinctly from the Lodgepole. However Corsican Pine also occurs throughout this compartment in intimate mixture with Lodgepole as well.

1.8.2.6 Overall timber value

As for C1. However there are notable stands of Sitka Spruce in this compartment and there is the potential to effectively "cherry pick" and extract smaller parcels of timber of higher value.

1.8.2.7 Top heights

Top heights range from 41 to 62 feet from the 12 sample plots, the average for the matrix species being 49.5 feet (15m). This indicates that overall this compartment is slightly higher on average than compartment 1.

1.8.2.8 Diameter at breast height

Dbh values from the sample plots used range from 23 to 32cm giving an average dbh value for the matrix species of 26.9. Again this is slightly higher than those sampled in C1 which indicates that overall the trees have performed slightly better in this situation than those in Compartment 1.

1.8.2.9 Volume

Volume lies between 244m^3 and 293m^3 per ha as for C1. This is calculated using FC's yield models for Forest Management. A similar situation exists regarding the performance of the trees in that they tend to have a considerably greater dbh than expected using the yield models. However in this case overall predicted heights are quite close to actual heights, the models predicting an overall top height between 14.3 and 15.9m.

1.8.2.10 Yield class

Yield class 8* Calculated as General Yield Class (GYC).

1.8.2.11 DAMS

DAMS scores vary across the wood from 14 to 16 dependent in this case on altitude and top heights of the matrix species. Generally the scores will tend toward the higher end of this range within compartment 2 because the area is slightly higher than compartment 1.

1.8.2.12 Recreation

Recreational facilities include the well-established path network and tracks put in originally for forest management. There is some evidence for informal and occasional mountain bike use. Walking and dog walking are also common activities.

1.8.2.13 Interpretation

There are currently no formal interpretive facilities in this compartment. Any interpretation currently undertaken here is by the Ranger Service taking groups round the forest.

1.8.2.14 Access

Access through the middle of the forest provides good access to C2 and a path along the northern edge allows foot access. However the latter has developed more as a desire line and is often overgrown by branches from trees planted close to the edge making the path difficult in places. The large failed and more open area toward the east of the compartment allows easier access through the forest itself.

1.8.3 Compartment 3

1.8.3.1 Size

36ha

1.8.3.2 Forest Type

High Forest, plantation origin

1.8.3.3 Soil

Mainly overblown sand. Needle litter has resulted in a mor humus overlying the sand. The soil is classified as a groundwater gley. *See soil description and soil pit photos.*

1.8.3.4 Rooting depth

Average, 25cm

1.8.3.5 Tree species

Dominant species include Lodgepole Pine, Corsican Pine, Mountain Pine and Sitka Spruce. A significant area of the compartment comprises a mixture of Lodgepole and Corsican Pine. Sitka Spruce tends to be represented in distinct stands and there is a significant area of more open ground, which has arisen through poor growth of Mountain Pine and Corsican Pine. Scattered broadleaves are throughout and some of the more recently planted Ash is now well established with strong leaders and good current increment. The overall matrix species is Lodgepole Pine.

1.8.3.6 Overall timber value

As for C1 and C2.

1.8.3.7 Top heights

Top heights range from 34 to 45 feet from the 12 sample plots, the average for the matrix species being 39 feet (11.8m). This indicates that overall this compartment is slightly shorter on average than compartment 1.

1.8.3.8 Diameter at breast height

DBH values range from 21 to 35cm the average for the plots sampled being 28.4cm

1.8.3.9 Volume

Overall volume as for C1 and C2, between 244 and 293m3. However in this case the top heights are markedly shorter than those predicted for a stand of this age and the dbh values much more.

1.8.3.10 Yield class

Yield class 8* Calculated as General Yield Class (GYC).

1.8.3.11 DAMS

The average DAMS score for the forest is 15. It is likely that this compartment will tend toward 16 as the ground rises slightly from West to East and the sheltering effect from C1 and the dunes beyond will start to be lost.

1.8.3.12 Recreation

Recreational facilities are limited. There are more informal footpaths in this compartment than in C2 and some glades as a result of low key thinning. Additionally there is a short section of boardwalk over a damp area. Walking and dog walking is the main form of recreation within this area and occasional mountain bike use.

1.8.3.13 Interpretation

As for C2

1.8.3.14 Access

As for C2 however there are more informal footpaths through this compartment many resulting from the informal thinning operations in the past which have created small glades linked with short sections of path that have been continually used as desire lines.

Forest by the Sea - Daryn Skinner, P4 Castletown Primary School

1.9 FORESTGALES ANALYSIS

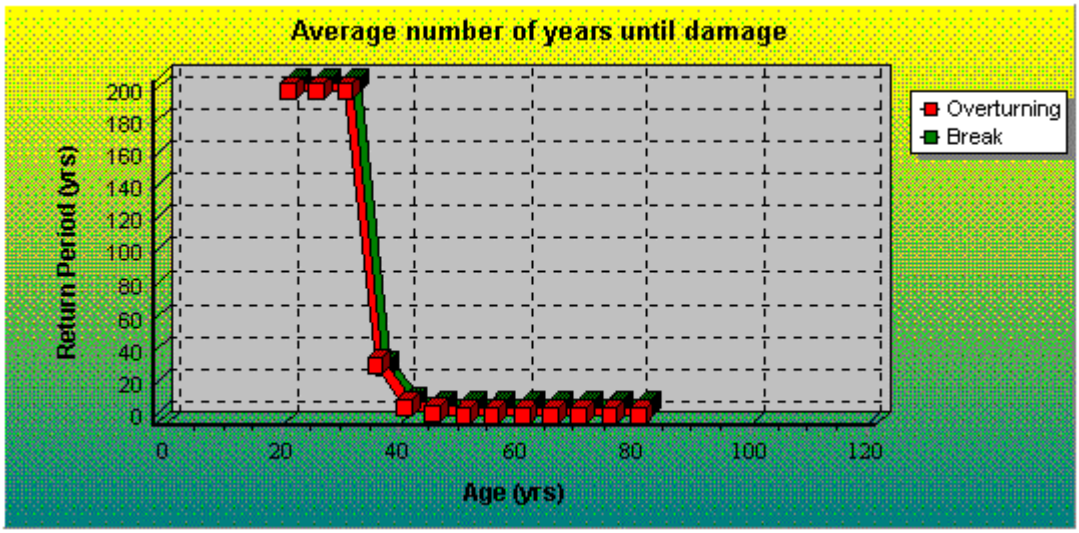
Introduction to ForestGales

ForestGales Analysis is a pc-based wind risk model for British forests. For detailed description of how the system works and the data sets used see ForestGales – Forestry Commission. The programme calculates the probability of average trees being damaged within a stand or compartment. Damage to the average tree implies that the stand as a whole will be substantially damaged.

The data required to run ForestGales differs slightly depending on what kind of output is required, e.g., ***Individual stand mode*** for calculating risk to a stand at this moment in time**,** ***Temporal mode*** for calculating risk to a stand over time determining when that risk is most likely to occur in future and ***batch mode*** for dealing with one stand after another.

The mode used in this analysis is temporal mode and the data required and obtained is species, soil type, cultivation, drainage characteristics, yield class, DAMS, initial spacing, forest edge data and thinning regime.

FORESTGALES ANALYSIS – COMPARTMENT 3



Age	Turn	Break	TopHt	DBH	Space
21	200	200	07.9	10	1.7
26	200	200	10.3	11	1.7
31	200	200	12.3	13	1.7
36	032	026	14.2	14	1.9
41	006	004	15.8	15	2.0
46	002	001	17.3	16	2.0
51	001	001	18.6	16	2.1
56	001	001	19.8	17	2.2
61	001	001	20.9	18	2.2
66	001	001	22.0	19	2.3
71	001	001	23.0	19	2.4
76	001	001	23.9	20	2.4
81	001	001	24.8	20	2.5

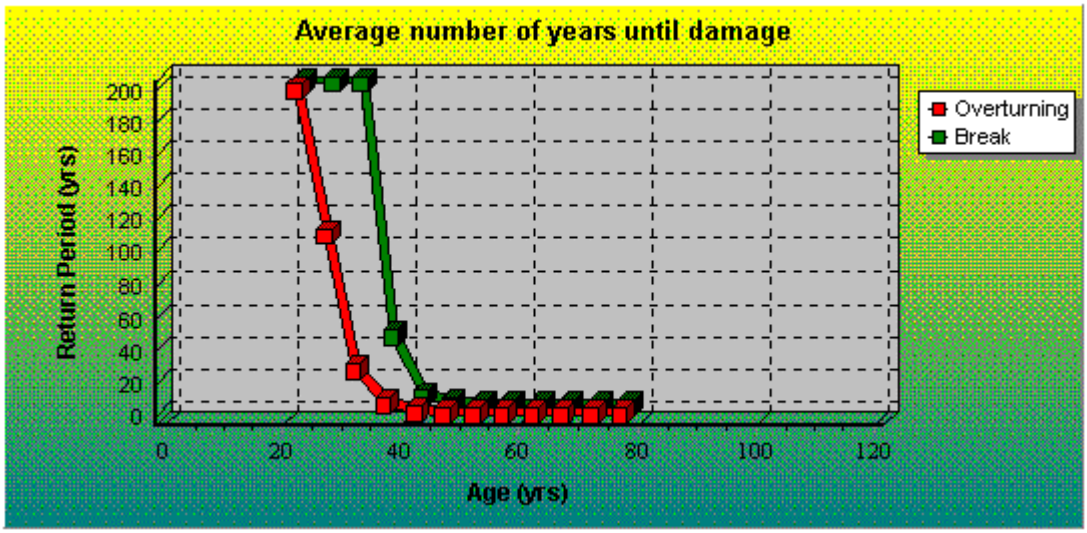
Turn: return period for uprooting
Break: return period for breakage
TopHt: top height of the stand
DBH: mean dbh of the stand
Space: mean spacing of the stand

Interpretation

In this analysis there is a close match between both windthrow and snapping gales probability. The sample for this stand was taken at a point where the nearest forest edge of similar composition (height, density etc) was over 100m away.

Therefore it is likely that wind speeds and intensity of gusting winds will be the same and unaltered by any local obstructions such as neighbouring crop and subsequently snapping will be as probable as windthrow at any given point in the rotation.

FORESTGALES ANALYSIS – COMPARTMENT 1



Age	Turn	Break	TopHt	DBH	Space
22	200	200	08.2	11	1.9
27	111	200	10.5	13	2.0
32	028	200	12.5	14	2.0
37	007	045	14.3	15	2.1
42	002	007	15.9	16	2.1
47	001	002	17.3	17	2.2
52	001	001	18.6	18	2.3
57	001	001	19.8	18	2.4
62	001	001	21.0	19	2.5
67	001	001	22.0	20	2.5
72	001	001	23.0	20	2.6
77	001	001	23.9	21	2.6

Turn: return period for uprooting
Break: return period for breakage
TopHt: top height of the stand
DBH: mean dbh of the stand
Space: mean spacing of the stand

Interpretation

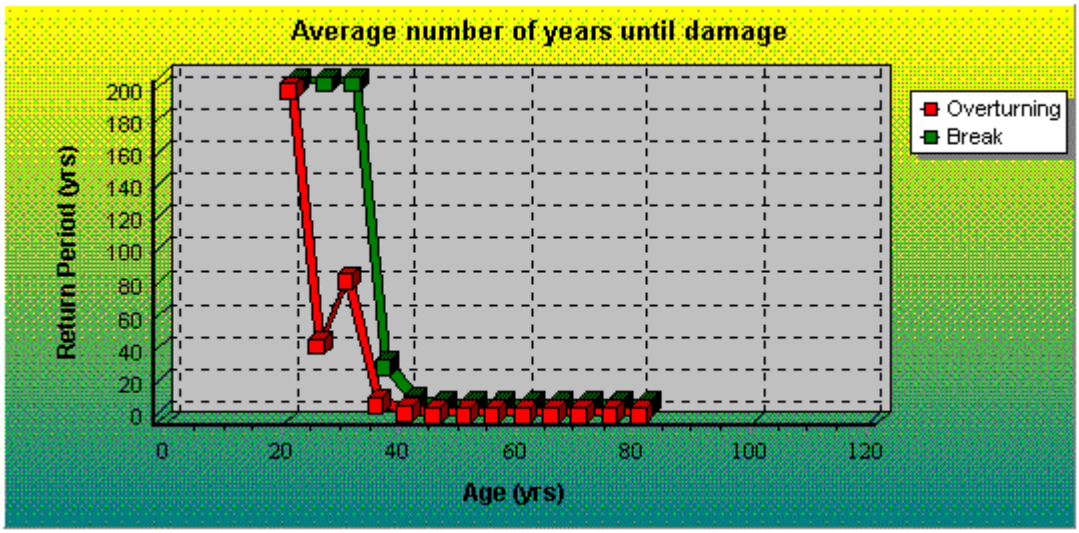
Data supplied for the analysis included, top heights, dbh, cultivation methods, drainage, species and whether the leading forest edge was a brown edge or a green edge and the distance from the nearest forest block. A brown edge is one which has been recently exposed by adjacent felling.

The edge given for this analysis was a green edge and the data included top heights from close to the western edge which are lower than heights further into the compartment.

Therefore the probability map shows a stronger likelihood of a blow earlier in the compartments rotation than a snapping gale. This is presumably as a result of both the green edge, and lower top heights given. The graded forest edge is likely to provide some shelter from catastrophic gales.

However, from the analysis the return period for a damaging gale diminishes quickly from year 20 – 40 in the rotation and rapidly from 30 – 40. The forest is therefore at an extremely vulnerable point in its rotation.

FORESTGALES ANALYSIS - COMPARTMENT 2



Age	Turn	Break	TopHt	DBH	Space
21	200	200	07.9	10	1.7
26	043	200	10.3	11	1.7
31	083	200	12.3	13	1.7
36	007	026	14.2	14	1.9
41	002	004	15.8	15	2.0
46	001	001	17.3	16	2.0
51	001	001	18.6	16	2.1
56	001	001	19.8	17	2.2
61	001	001	20.9	18	2.2
66	001	001	22.0	19	2.3
71	001	001	23.0	19	2.4
76	001	001	23.9	20	2.4
81	001	001	24.8	20	2.5

Turn: return period for uprooting
Break: return period for breakage
TopHt: top height of the stand
DBH: mean dbh of the stand
Space: mean spacing of the stand

Interpretation

The pattern for C2 is much the same as for C1 apart from an interesting blip in the probability of windthrow between year 25 and 30, when the plantation appears to be less likely to suffer from a catastrophic gale for a short period.

The data supplied for this stand differed only slightly from C1 and C3 in that the drainage parameter was entered as average rather than poor. The area sampled did show slightly better drainage than the other two sites and therefore it is likely that following the first trough when much of the crop would be flattened a percentage of the trees would be left being slightly more resilient than their neighbours in the other compartments.

However these too would be vulnerable to windthrow over the following ten years.

DUNNET FOREST MANAGEMENT PLAN
Location of Soil Pits
SCALE 1:10,000
ND 220698
1
2
3

SOIL PIT 1

Soil pit 1 – see soil sample map

Horizon	Thickness	Colour	Stoniness	Texture	Rooting depth	Notes
A	2cm	Brown	Stone free	Loamy sand	Throughout	Up to 1cm thick
Bg	6cm	Grey/brown	Stone free	Sand	Throughout	5mm and less
C	>1m	Yellow	Stone free	Sand	Up to 30cm	1mm thick

Humus form Mor. Needle litter, partly decomposed mosses, no earthworms present

SOIL PIT 2

Soil pit 2 – see soil sample map

Horizon	Thickness	Colour	Stoniness	Texture	Rooting depth	Notes
A	4cm	Brown	Stone free	Loamy sand	Throughout	Up to 1cm thick
Bg	10-12cm	Brown/yellow	Stone free	Sand	Throughout	5mm and less
C	>1m	Yellow	Stone free	Sand	Up to 4cm	1mm

Humus form Oligomull, earthworms present

SOIL PIT 3

Soil pit 3 – see soil sample map

Horizon	Thickness	Colour	Stoniness	Texture	Rooting depth	Notes
A	2-3cm	Brown	Stone free	Loamy sand	Throughout	Up to 1cm thick
Bg	8cm	Grey/yellow	Stone free	Sand	Throughout	5mm and less
C	>1m	Yellow	Stone free	Sand	Up to 30cm	1mm thick

Humus form Mor humus, partly decomposed mosses and needle litter, no earthworms present.

ANALYSIS AND EVALUATION

2.1 STRENGTHS

Dunnet Forest's main strengths relate to its potential rather than any single current management objective. Because it is a woodland in an otherwise open and relatively treeless landscape it has a significant inherent value that many woodlands further south would not have. The eye is naturally drawn to it when viewing the landscape from further afield and in an area of dunes, sea, cliffy headlands and farmland it has a curiosity value to the visitor.

The forest's close proximity to a main road, car parking and ease of access make it an ideal informal recreational resource for both visitors and locals alike. It is only 10 miles from Thurso and makes for a convenient place for a walk, jog or bike ride when inclement weather makes a similar excursion to the coast less attractive.

Its inherent value and differences to the surrounding landscape also make it a valuable educational resource. Schools already make use of the forest through the Ranger Service and as part of the national curriculum. "The nearby visitor centre provides a focus for wider interpretation of the NNR and seasonally employed staff organise walks within the forest boundary", *MacLennan I, Dunnet Forest Review of Environmental, Educational and Recreational Opportunities, 1990.*

It is of a size that opportunities could be exploited which will provide locals with a modest supply of firewood on a sustainable basis. Much of the timber is of poor timber form but conversion to chips could be worthwhile with the growing interest in over-wintering cattle corrals in the area as well as the developing market for wood fuel heating not withstanding the use chips could have for footpaths within the forest.

Activity of this kind could be provided for in the shape of one full time position working over Dunnet and possibly another forest in the area or two part time positions, one focusing on physical site management for timber and timber products working over Dunnet and another forest and the other focusing on education, recreation and interpretation.

Whichever route or option is finally taken it is highly likely that there would be a requirement to submit a bid for funding to effectively pump prime the post(s). Therefore further exploration of the work required and any subsequent job description would be necessary.

2.2 WEAKNESSES

Some of the factors, which relate to Dunnet Forests' attributes and potential, could conversely be cited as weaknesses. For example the fact that the woodland is relatively remote and not in an area that the visiting public are likely to associate with woodland or forest walks make it a challenge to promote to a wider audience. Similarly current users have the use of a surfaced car park which is obviously a strength, but with figures quoted of over 3000 per annum and the car park often over-full a weakness seems apparent in the carrying capacity of the site, certainly as it is managed now.

Other site-specific weaknesses include wildlife interest, educational interest and the type and state of the forest itself.

The wildlife interest of the forest within a wider ecological unit is represented by some gain in habitat diversity supporting forest dwelling species, e.g., coal tit, great tit, long eared owl. However a significant amount of species diversity related to the Links interest has been lost as a result of the forest cover. Additionally in terms of its' current potential as a woodland for wildlife Dunnet forest ranks low being predominantly an even aged coniferous plantation, largely unthinned with little interest in terms of woodland ground flora and associated fauna. Species diversity is low and while habitat and structural diversity is better (largely through default and chance) through the presence of open areas and forest edge, the forest has little to offer in terms of species diversity.

The wildlife interest is closely linked to its educational value. There is only so much that can be studied in the forest in its present form. Management of the forest could also be studied but at this moment in time management is limited to path clearance and occasional windthrow clearance and therefore opportunities are limited.

A significant weakness affecting future management is related to the precarious nature of the standing forest blocks. Some of the trees are now starting to blow over and Forest Gales analysis indicates this situation is likely to come to a head in the very near future with significant amounts of timber likely to be uprooted and/or snapped. An attempt at line thinning in compartment 1 has resulted in significant windthrow already and this option for the future management of the forest should be effectively ruled out. Couple this growing threat with the poor or even negative value of the trees as an economic resource and any management which looks at sustaining forest cover indefinitely would appear expensive, at least in the short term if not medium to longer term.

2.3 COMMUNITY ASPIRATIONS

Most people take the forest for granted because it is there and has been increasingly accessed by more and more people from a wide area. However, having had this amenity for so long the thought of "Dunnet without a forest" is not acceptable. General opinion seems to favour little change. A tidy up is desirable as is additional planting of more broad-leafed species. Something has to be done if only to retain the forest as an asset and amenity for the area. It is accepted that more requires to be done to manage and sustain the forest as a "Forest for All". That is a long-term view.

A long-term (permanent) conventional timber-related business based on Dunnet Forest alone is not a viable proposition. This is not something that the Dunnet Forest Steering group aspire to either. While they would like to see some sort of economic benefit arising from the management of the forest it is not through the ongoing exploitation and management of the wood as a commercial timber operation. There is however a desire to facilitate local jobs and therefore it may be more appropriate to consider something which focuses more on recreation, education and interpretation but does not exclude some form of low key management activity for timber or timber products. To this end it would be desirable to create a post the remit for which would include much of the work identified in this plan.

2.4 GENERAL OPPORTUNITIES

The potential and subsequent opportunities Dunnet Forest could provide are diverse and many and include the following,

- Restructuring toward a more diverse forest structure with more species diversity creating a multi purpose forest with multiple benefits including, enhanced wildlife value, educational value, recreational value and modest timber value.

- Encourage and harness community support and involvement in partnership with SNH in order to strengthen local "ownership" of the forest satisfying SNHs' strategic objectives and fulfilling community aspirations.

- Allow and encourage joint funding bids through the relationship provided between DBI and SNH to fulfil management aims and objectives, thus levering in more funds to the area and facilitating SNH funds to go further

- Promote the forest as a model for the potential future management of remote conifer plantations for multiple benefits using community involvement as a major tool.

- Community and sustainable rural development projects based on multi purpose forest management.

2.5 IDEAL MANAGEMENT OBJECTIVES

2.5.1 To protect the conservation interest of the forest

- Collate the information already available on the forest.
- Maintain a record of management
- Survey the present habitats in particular those created by the Objective 1 developments.
- Continue butterfly monitoring, perhaps altering the areas monitored to incorporate new clearings.
- survey ponds annually.
- initiate survey on new pond
- collect bird records
- monitor sites of rarer plants (Primula Scotica & Wintergreen)
- monitor species rich turf, extent and quality
- Introduce broadleaves where possible but maintain some conifer cover for shelter in the winter and feeding for crossbill/ finch/tit.
- introduce hardy berrying shrubs and climbers (honeysuckle and ivy) to provide additional cover and attract bees/moths and to help graded forest edges.
- Retain some of the darker mossy areas and fallen timber to provide decay, cover and habitat.
- continue nest box erection and monitor using schools and youth groups to erect.
- maintain quiet undisturbed areas.
- bird feeders. Maintain and stock in winter.
- Look into the opportunities for enhancing wildlife aspects and involve/inform community where possible.

2.5.2 To use the forest as an educational resource

- Carry out the Environmental Education plan as discussed with SNH & Ranger Service (RS)
- Arts- encourage the use of the forest as a place for visual and environmental arts.
- Encourage the use of the forest for events and performances using local or travelling theatre.
- Encourage other groups to use R.S. or seek advise when using the forest for environmental purposes e.g. pond dipping.
- Work with Ranger Service & Schools/youth groups
- Explain to the public the past & present management of the forest through open days or newsletters.

2.5.3 To maintain access

- Look at long term path network with possibility of closing off and opening up new paths.
- Maintain the existing path network i.e. disabled access path
- Maintain way markers around the interpreted trail.
- Maintain boardwalks and non-slip netting, bridging ditches with boardwalks where necessary.
- Explore possibility of cycle track
- Maintain car park area & signage.
- Remove fallen timber that has blocked paths and unblock drains.
- Monitor paths regularly.
- Discourage overnight parking
- Set up orienteering/ biodiversity trail
- Investigate the possibility of shelters perhaps themed using local wood with youth groups to help construct
- Add seating to allow resting places for less able.
- Maintain hide using it for interpretation.
- Remove rubbish and empty dog bin.
- Maintain picnic benches.

2.5.4 To keep informed of up to date forest silviculture and community management of forests.

- Become members of and attend occasional meetings / workshops of Reforesting Scotland
- Communicate with other Comm. Forest groups for sharing ideas and gaining inspiration and make use of North Highland Forest Trusts' community forest forum
- Hold Open Days annually.
- Promote forest events through posters and the press.
- Communicate any forest works (e.g. structural) to the public.

- Produce newsletter available in R.S. base and local shops
- Have comment book available in the R.S. base for public to use.
- Web site- become part of Dunnet Bay Initiative web site when it's up & running.

2.5.5 To assess the potential for training in forest skills that can be derived from managing the forest.

- To assess the potential for training in forest skills that can be derived from the forest.
- From the silviculture plan assess the forestry skills needed and look into training and employment potential
- Extend this training to voluntary groups where possible.
- To keep informed of up to date silviculture and community management of forests so as to be aware of opportunities for non-timber forest products.

2.5.6 Organise Administration

- To manage group accounts organise meetings and maintain membership.

2.6 CONSTRAINTS

2.6.1 Physical

From a combination of results of the Forest for Real exercise and community aspirations outlined by the Dunnet Forest Steering group an objective to maintain the forest, as a forest is clear. Accepting therefore that the trees will continue to grow and become increasingly susceptible to windthrow the logical next step is to accept that the forests' management requires prompt attention.

Drawing on the Forest Gales Analysis it is clear that the forest will need a significant management input for it to remain a forest. There exist very real, physical, site based constraints on many of the ideal management objectives outlined above resulting from the forests' fragile predicament. Additionally the work required for restructuring and/or remedial tasks mean further constraints on some of the objectives stated above, e.g., felling v access, extraction v footpath/track erosion, etc.

Further physical constraints become obvious when considering species composition of the restructured forest, e.g., high water table, seasonal water logging, sandy substrate, high windiness scores etc. Therefore matching species to site conditions will be essential to limit further problems with the physical management of the forest.

A lack of a hard standing area is also a problem when considering timber storage and turning for vehicles used in the transport of the timber, whether these are timber lorries or pick ups. The presence of overhead wires in the form of the hydro board way leave will also create difficulties for extraction routes toward the main road.

All areas of short species rich turf should be maintained. This habitat is currently the only one worthy of designation within the forest and therefore should receive some attention to maintain its interest.

2.6.2 Legal

The site lies within Dunnet Bay SSSI and therefore any Potentially Damaging Operations (PDO's) will have to be identified and consents applied for. Prior to forest operations SNH will be notified of the operation, its proposed timing, location and extent. SNH will issue a consent form which DBI will be required to complete and send back to SNH. On approval of consents the work can be implemented.

No local byelaws are in place.

Any felling amounting to more than $5m^3$ per annum will require the need for a felling license. Additionally any felling at all requires that FC be notified.

2.6.3 Objective 1

Certain recreational and interpretative facilities and provision were made using Objective 1 funds, including,

- Improvement of over 2km of footpaths, including over 1 km of surfaced path to permit wheelchair access,
- Over 200m of boardwalk including a section to permit wheelchair access to an existing pond
- Habitat creation including marsh, open water, grassland and woodland
- Construction of a hide to overlook new wetland
- Picnic bench
- Signs x 4
- Tree removal from archaeological feature
- Leaflet

All those physical features within the forest listed above are required to be protected in any future management. Any ongoing contract therefore should have the maintenance and protection of these features built into it for a minimum of 10 years.

2.6.4 Community

There is little appetite within the community for a form of management which necessitates large scale change to the forest over a short period of time, i.e., clearfelling and re-stock. From the communities perspective the ideal form of management is one where change happens slowly with little disturbance to the forest and its users. This places a constraint on "quick fix" solutions.

2.6.5 Conflicts

The conflicts identified and discussed earlier place a constraint on the management of the forest as a multiple benefit resource. It is clear from the consultative exercises and the communities' aspirations the majority of the community would like to encourage some forms of recreational use and not others.

2.6.6 Owner aspirations

The view of Scottish Natural Heritage hinges on three main issues

1. A greater level of community involvement including wherever possible devolved decision making on the management of the forest to the community
2. Damage limitation, both in terms of the forest resources and financial costs of implementing management
3. Retention of conservation, access and educational facilities

Management must therefore be a compromise between what the normal conventional approach to a resource of this type and this condition would be and an approach that was more sympathetic to community needs and aspirations. SNH desire within reason to accommodate a compromised and negotiated approach to management.

2.6.7 Public liability

Public liability at present is covered by SNH. This issue will require attention if the future management of the site is taken forward using any other form of legal agreement than that currently in place, e.g.,

management agreement or lease between SNH and DBI. Additionally any physical site works are likely to require a risk assessment and any contractor will require public liability insurance upwards of £2m. This quite often places a constraint on management and which contractors are chosen for any site works.

2.6.8 Landscape

Large-scale clearfell and re-stock often produces a negative impact on the landscape. This will need to be considered before any implementation of restructuring work and ideally at the planning stage. Landscaping within the forest will also be an important factor. Adverse public opinion has been voiced in the past when relatively small works have been carried out. If this is to be avoided in future a programme of education as well as sympathetic work practice will be required placing a constraint on the management and management resources.

2.6.9 Resources

Financial resources are currently negligible. Some finance has been obtained by DBI for the Dunnet Forest Steering group from SNH for the production of a management plan. As a small voluntary group DBI is able to fundraise and access funding from sources that statutory organisations are unable to use. There are a number of sources of funding for voluntary community groups, which the Dunnet Forest Steering group would be eligible to apply for. However at this moment in time lack of financial resources is a constraint on the management of the forest. Additionally DBI and Dunnet Forest Steering Group are completely voluntary and therefore rely on already busy volunteers for its direction and work. Implementing an ongoing management regime for the forest would therefore be constrained by relying purely on volunteer labour.

Forest by the Sea - Robert Reid, P7 Castletown Primary School

OPTIONS APPRAISAL AND DEFINING OBJECTIVES

3.1 Introduction

Had Dunnet Forest been a commercial success then it would have remained with the Forestry Commission. Therefore commercial considerations have to be minor but not totally ignored if expenses can be defrayed by any commercial activity. Additionally options have to be appraised against a background of the constraints discussed earlier and the relative urgency imposed by the condition of the forest and the results of the Forest Gales Analysis.

A number of options have been determined based on Dunnet Bay Initiative Forest sub-group aspirations, the community consultation exercise and the agreed Vision Statement at the beginning of this management plan.

3.2 Options for management

1. Concentrate on **conservation** of the woodland still standing and clearing fallen timber but retaining sufficient brashing to allow decay, and cover.
2. Survey all paths, fences and ditches to establish what requires immediate attention and what needs to be retained or discarded.
3. Identify and prioritise areas for clear fell and replanting based on Forest Gales Analysis and restocking objectives.
4. Establish and develop an on-going **educational** programme.
5. Discuss with interested groups how their **recreational** activities may best be served.
6. Discuss funding/finance.
7. Establish good relations with neighbours.
8. Identify skill and resource gaps.
9. Discuss publicity and how to involve individuals and groups.

3.3 Specific prioritised objectives

1. Protect the conservation interests of the forest by maintaining the forest as a whole.
2. Use the forest as a valuable educational resource.
3. Maintain access to the widest public
4. Identify and prioritise areas for clear fell and replanting based on Forest Gales Analysis and restocking objectives.
5. Discuss publicity and how to involve individuals and groups
6. Discuss funding/finance
7. Establish good relations with neighbours

Not withstanding issues connected to the constraints e.g., legal, Objective 1 etc. The three main options which could be implemented in such a way to satisfy most if not all the Priority Objectives are,

1. To undertake a large clear fell and restocking exercise over those areas of the forest most at risk concentrating activity in as short a time period as possible and starting as soon as possible

2. To undertake a felling and restocking exercise over a long period (10-15 years) starting in the areas most at risk and focusing on the creation of ever widening glades which are either left open or restocked with appropriate species, including both natives and exotics. Included in this option would be the provision of a rapid reaction policy which enabled any catastrophic wind throw events to be dealt with as and when they occurred.

3. To undertake a felling and restocking exercise over a more medium term period (5 years) starting in the areas most at risk and focusing on shelter wood systems by initiating felling on the leeside of the stands and compartments and using the cleared areas for restocking. Some effort should also start in the so-called “failed” areas. This system would also require having a rapid reaction policy built into it.

3.4 OPTION 1

3.4.1 Advantages

It is likely to be the cheapest option even though market prices are so low as it will involve only one large operation and involve larger economies of scale. Additionally some of the better timber is likely to offset some of the deficit from the poorer quality Lodgepole and Corsican Pine.

The operation will be over relatively quickly (within a year and probably concentrated over a few weeks) and therefore peoples' negative perceptions of forestry work will only likely to be concentrated over a similarly short period.

The work is likely to be undertaken by an outside management company/contractor and therefore once the tender has been agreed time and effort spent on the exercise by the community and/or owner will be minimal

3.4.2 Disadvantages

It is highly likely that there will be a degree of negative PR arising from this option especially considering this has been the case in the past after relatively small works. The criticism is likely to be targeted at the community and SNH.

This operation will cause maximum disturbance to wildlife and greatest loss of habitat in a short period.

There will be few if any benefits to the community in terms of revenue or timber as the lots will be bought as a whole standing and community involvement and therefore development will be minimal.

Large areas of shelter, which could be used to good effect for the quicker establishment of the restock, will be lost.

3.5 OPTION 2

3.5.1 Advantages

This is probably the most natural option in an unnatural situation. By undertaking the clear fell over a longer period wildlife has longer to adapt to change. Additionally habitat creation and habitat loss are occurring at the same time.

Wind throw is more likely with this option, but by allowing catastrophic events such as gales to blow over areas of forest a more natural dynamic will be established.

By using ever widening glades as the areas within which restocking will take place surface area of woodland will be maximised in addition to enhanced informal recreation, e.g., picnic areas.

This system would require an ongoing commitment of physical management and monitoring and would therefore be labour intensive meaning employment opportunities for local contractors.

3.5.2 Disadvantages

This system will be the most expensive. It is most unlikely that it will produce an income from timber that will cover the costs of employing someone to undertake the work required.

This option will require a significant input from the community and/or SNH to oversee that repeated contracts are undertaken to the necessary (and possibly changing) specification required.

By allowing relatively large areas to blow over means excepting a higher degree of risk to public safety and planning restocking so that the newly planted trees are not damaged by wind throw events becomes more uncertain. Wind throw looks unsightly and is hazardous and expensive to clear.

3.6 OPTION 3

3.6.1 Advantages

This option represents the best compromise between what is required based on the sites physical constraints and the minimal impact and change the community wish to see.

Disturbance to wildlife is spread over the five-year period allowing nesting birds and other animals to adapt more readily to the change.

A number of shorter and smaller contracts will be required increasing employment options for local contractors/people.

The opportunity for “cherry picking” of smaller but higher value parcels of timber will exist enabling small amounts of added value to be realised and some timber to be held back for forest infrastructure projects

Shelter from felling coupes will provide a good start for the restocking

3.6.2 Disadvantages

A number of smaller contracts will mean greater total administrative and operational costs as well as time inputs.

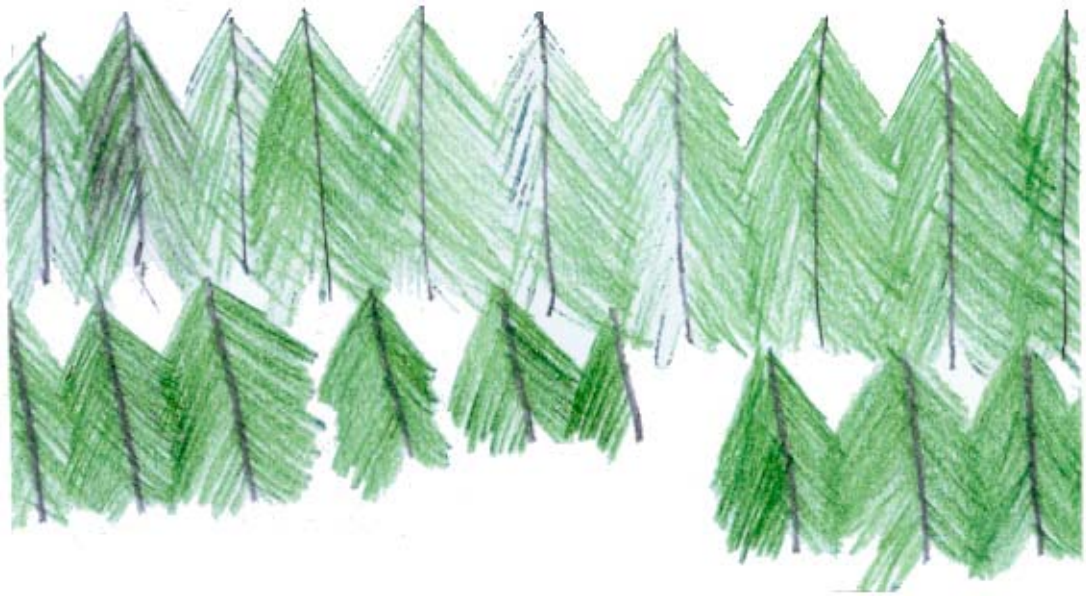
Wind throw could still play a part and a budget would still be required for a rapid reaction squad to deal with any damage from gales although this would be less likely than Option 2.

The presence of contractors spread over a longer period of time may result in some negative PR.

Public safety and liability remain high on the agenda for a prolonged period in comparison to Option 1.

3.7 Conclusion

Following consultation between SNH and members of DBI it has been agreed that Option 3 and the Prioritised list of Management Objectives listed above should be adopted as the mechanism by which to take forward the management of Dunnet Forest.



Michael Sutherland, P5 Castletown Primary School

MANAGEMENT OBJECTIVES AND PRESCRIPTIONS

4.1 TWENTY-FIVE YEAR PLAN

The twenty-five year plan or long-term plan will show a clear direction toward fulfilling the Vision statement made at the beginning of the management plan. The main components of this vision are that, the forest will still be a forest, it will be managed by the community, it will have a rich and varied wildlife and it will essentially be an outside classroom within which there will be opportunities to learn about, enjoy and respect the natural environment.

The first five years detailed within the Five-year plan will mark the start of the process and work required to steer the management in this direction. The five year plan will be the first detailed work programme relating to the directional strategy of the 25 year work plan.

4.1.1 Twenty five year work plan

The projects identified in this table have arisen through a combination of discussion with Dunnet Forest Steering Group and their consultation exercise. They have been distilled further and are listed as projects at 4.1.5 below. The numbers identified under Relevant Projects in this table relate directly to the listed projects in 4.1.5.

Period	Relevant Project(s)	Action required
2001 - 06	1-14.	Implement five-year work plan and monitor/review progress. Once the relative large-scale works are almost complete of clear felling and restocking, the first five years will be reviewed and a start will be made on the second five-year plan.
2006 - 11	2,3,4,6,8,9,10,11,12, 13,14.	Implement second five-year work plan. A new funding package will be required for every five-year work plan following the initial package for the first five years. The nursery work will entail ongoing production and maintenance. Focus on maintenance of restock, footpaths and access and development of skills within DBI and the community generally. Monitor and review and start the development of the third five-year plan.
2011 - 2016	2,3,4,6,7,8,12,13	Implement five-year work plan. Focus on habitat management as well as monitoring, reviewing and developing educational strategy/plan. Monitor and review and re-visit Vision statement in order to determine whether the vision fully serves the views and aspirations of a different community membership. Schools work and contacts should have been fully explored by this point and now be focused on ongoing educational programmes and projects. Any replanting arising from earlier restructuring work should have finished by now and ongoing monitoring of the success of this and very occasional planting will be maintained. Start the development of the fourth five-year plan.
2016- 2021	2,3,6,12,13.	Implement five-year work plan. The restructured forest should no longer have any need for windthrow clearance. Focus on future educational and recreational potential pivoting on the conservation value of the forest. Monitor and review. Develop final five-year plan.
2021 - 2026	2,3,6,12,13.	Determine the level to which the Vision statement has been satisfied, review strategic direction and create a new Vision if necessary. Focus on reviewing success, failures, and strengths weaknesses etc. Produce a further 25-year management plan, which incorporates any strategic changes in direction decided on.

4.2 FIVE YEAR PLAN

The first five years of the 25-year management plan will be focused on the following projects:

4.2.1 Projects identified by the Dunnet Forest Steering group

1. Seek charitable status.
2. List annual tasks – Felling, planting, paths drainage etc.,
3. Establish nursery for shrubs and young trees.
4. Survey all existing paths, fences and ditches.
5. Seek adequate funding to implement the first five year plan
6. Create shelter for the forest
7. Replant with shrubs & graded heights of broad-leaved trees.
8. Clear fell areas most devastated by wind
9. Replant these areas with greater emphasis on broad-leaved species.
10. Improve facilities round wetland and hide.
11. Cement established contacts with local schools and extend if possible.
12. Seek written views and aspirations of conflicting groups pre discussion.
13. Create own publicity to inform tourists and locals about forest activities.
14. Investigate feasibility and viability of perimeter path

4.3 FIVE YEAR OPERATIONAL PLAN TABLE

The five-year operational plan represents the development of objectives and prescriptions derived from the priority projects identified above in addition to ideas arising from discussion and consultation with both Dunnet Forest Steering Group and SNH. The table represents the first five years of management and therefore not all the objectives identified above are listed. They will be included in further five year rolling programmes determined during consultation between Dunnet Forest Steering Group and SNH before completion of the first five years.

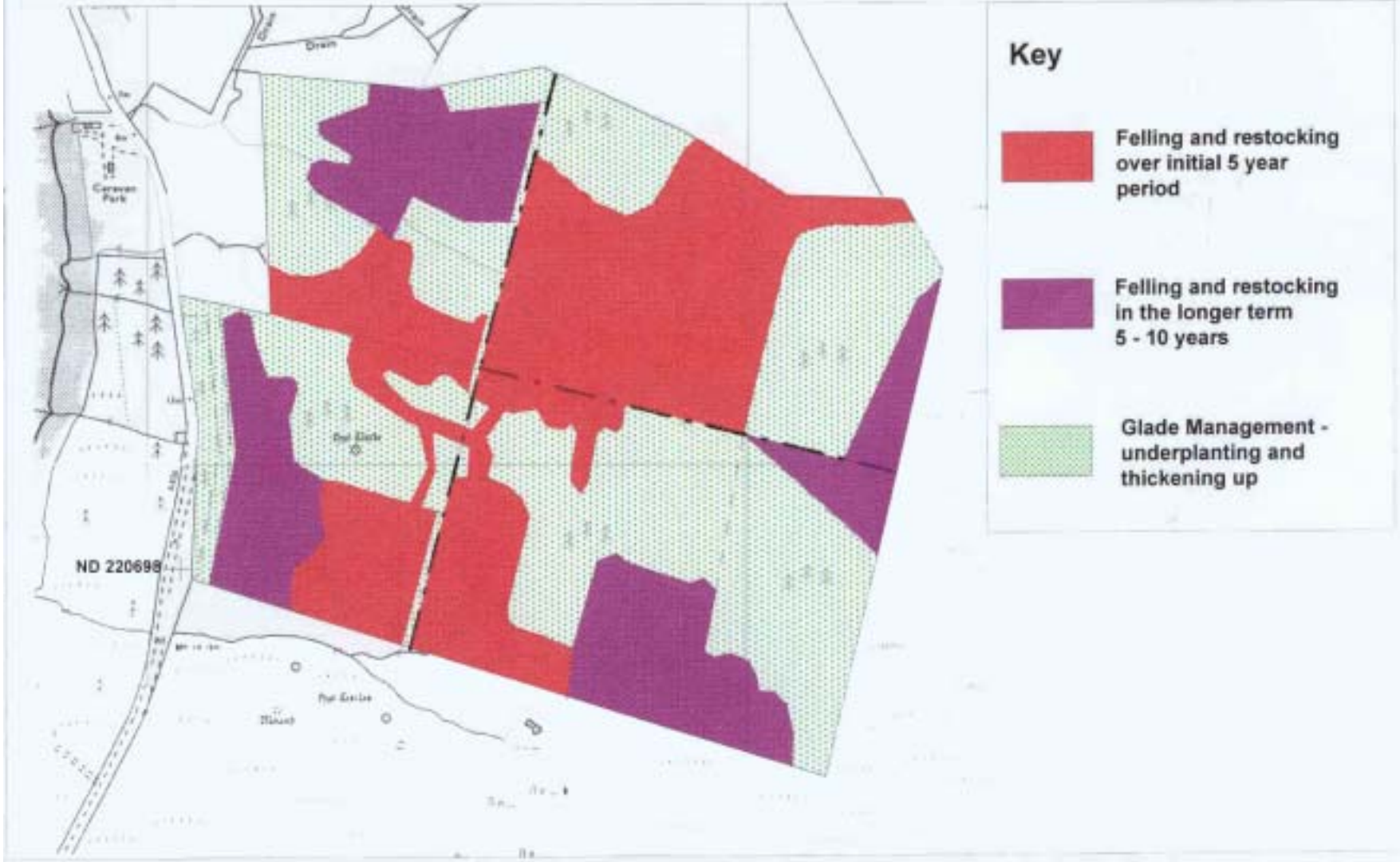
OPERATIONAL OBJECTIVES	MANAGEMENT OPTIONS	OUTLINE PRESCRIPTIONS	YEAR
1. Safeguard the future of the forest as a whole	Active management	1. Implement a five year rolling programme of felling and re-stocking throughout those areas of highest risk. All features created as part of the Objective 1 funding package will be maintained and safeguarded 2. Apply for WGS grant aid	01 – 06
1a). Enhance the structural diversity of the forest	Active management	1. Implement a five year rolling programme of restructuring the forest focusing on restock areas and existing "failed" areas using a variety of species and a variety of planting systems	01-06
1b). Safeguard shelter wood and restock/restructured areas	Active management	1. Implement a wind throw monitoring programme 2. Implement a wind throw clearance programme based on monitoring programme which focuses on the risk to the restock/restructured and shelter wood areas 3. Protect young saplings from grazing pressure	01-06
1c). Safeguard shelter belt on western boundary	Active management	Create a new post and rail fence along the western edge of the forest adjacent to the road	02
1d). Discourage and aim to prevent the entry of stock into the forest.	Active management	Repair and maintain all boundary fences to a stock proof standard	02-06

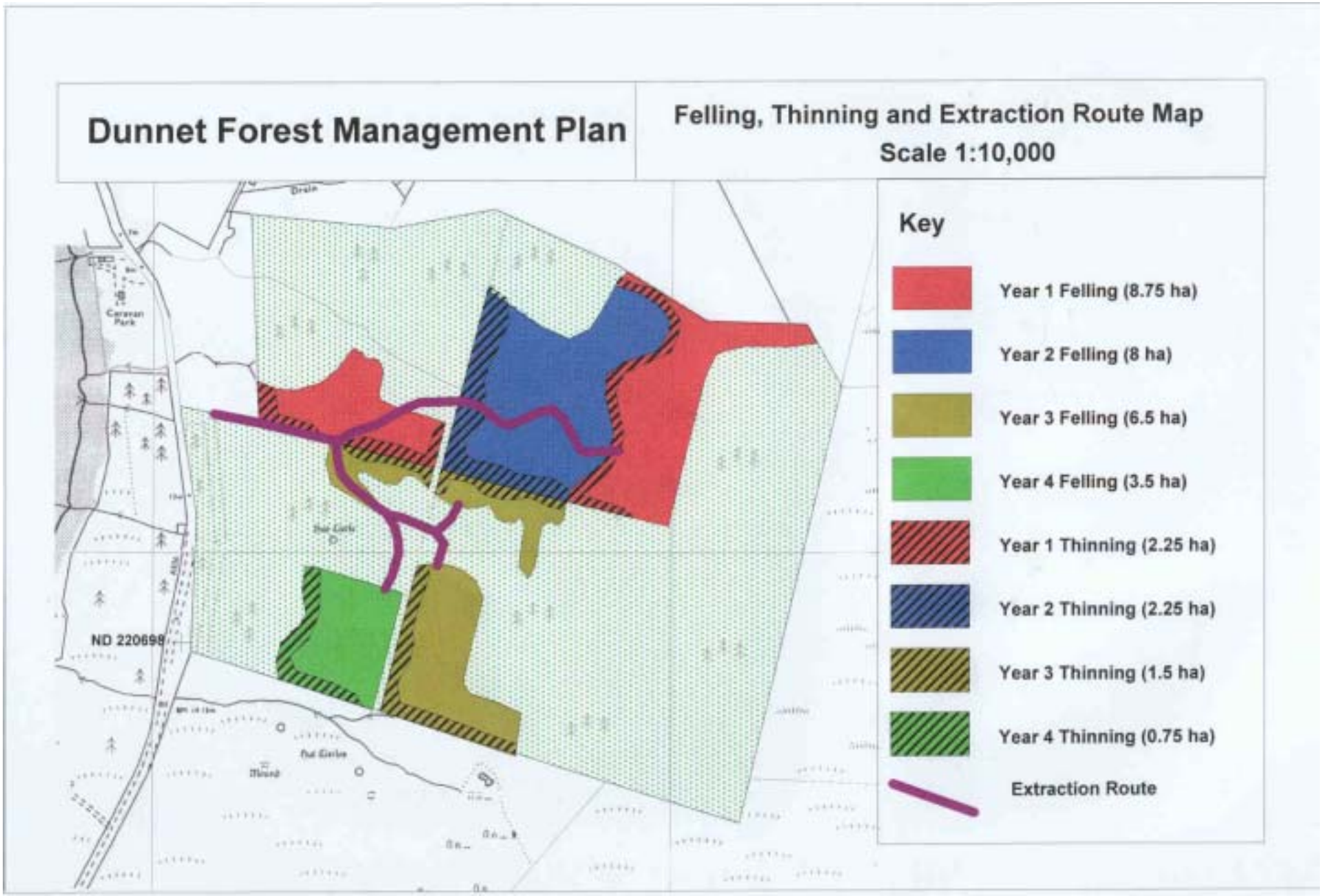
1e). Safeguard and maintain features funded under Objective 1	Maintained	1. Employ contractor 2. Survey and repair any damage 3. Incorporate requirements for obj 1 funded works into active management prescriptions	01-06
2. Rely more heavily on locally sourced and grown stock	Site integrity	Create a tree nursery focusing on the production of material sourced from the forest and its environs	01/02
3. Enhance the conservation interest of the site	a) Minimum intervention b). Active management	Leave the open "failed" areas at the eastern extremity of C3 unplanted with trees. Replace felled and any wind thrown timber with shrubs Create ever widening glades within "failed" areas elsewhere with a structured ecotone to the glade edges Clear trees away from burn edges to create 50% dappled shade Create a graded ecotone to forest paths and rides using shrubs Monitor and regulate if necessary rabbit grazing to maintain the areas of species rich grassland.	01-06
4. Promote the forest as an educational and interpretative resource	Education/ interpretation	Cement established contacts with schools, make new ones and foster awareness of the forest as an educational resource Establish a forest events programme promoted locally and further afield Network information on the forest and promote it as a demonstration community woodland for other community groups and agencies Working in equal partnership with SNH develop and implement an educational use programme/plan for the forest Enhance and improve facilities around the wetland and hide.	01-06
Promote responsible use of the site	a). Education b). Site integrity c). Recreation	Implement a membership drive to attract new members to the forest group and encourage regular discussion and feedback from the membership and wider public Form a recreational sub group which brings together all the interests Zone the forest either spatially, temporally or both in order compromise is reached and as far as possible all groups are catered for Make recreational maps widely available Implement footpath, track and recreational facilities survey including the feasibility of a perimeter path	01/02
Consolidate the status of the Community Forest Group	a). Community development b). Administration	Following and in consultation with members of DBI seek charitable status for the group Assess potential for training in forest skills and identify relevant courses if appropriate Include administrative costs in any funding applications	01/02

Dunnet Forest Management Plan

Indicative Silvicultural Operations Map

Scale 1:10,000




Dunnet Forest Management Plan
Felling, Thinning and Extraction Route Map
Scale 1:10,000
Key
Year 1 Felling (8.75 ha)
Year 2 Felling (8 ha)
Year 3 Felling (6.5 ha)
Year 4 Felling (3.5 ha)
Year 1 Thinning (2.25 ha)
Year 2 Thinning (2.25 ha)
Year 3 Thinning (1.5 ha)
Year 4 Thinning (0.75 ha)
Extraction Route
ND 220698
Caravan Park

4.4 PROJECT REGISTER AND DESCRIPTION

OPERATIONAL OBJECTIVES

1) Safeguard the future of the forest as a whole

Implement a five-year rolling programme of felling and re-stocking throughout those areas of highest risk.

Felling will start in those areas of highest risk identified in the Forest Gales Analysis and marked on map. As a general rule felling will start on the leeward side of catastrophic gales, east, southeast and work in a westerly direction. A buffer zone will be implemented on the windward or western edge of the felling coupes where clear fell operations will stop and a selective thin 25m deep into the forest will be implemented. Only those trees at critical height and at most risk will be felled and extracted in this zone leaving smaller, lower risk trees in place. This will act to break up the eddying effect of westerly gales and provide a sheltering effect from easterlies. Felling will commence in Autumn/Winter 2001 in C2 and 2002 in C1and C3. In this way extraction routes through C2 will have been cleared for timber from C3. Any brash not used as brash mats for extraction will be gathered up for use as habitat piles.

Restocking will start in 2003 leaving a year for populations of Pine weevil to drop to satisfactory levels. Detailed species percentages will be supplied in any WGS application. Species composition will focus on what the site will grow instead of on any one specific objective. Therefore there will be an emphasis on mixed planting with a significant degree of reliance on exotic conifer and broadleaved species. Timber productivity and yield will be a low priority while crop stability and resistance to wind throw will be a high priority. Therefore trees which tend to produce large top heights will be avoided. Species composition is likely to include, Lodgepole Pine, Mountain Pine, Macedonian Pine, Sitka Spruce, Rowan, Ash, Downy birch, Sycamore, Whitebeam, Cotoneaster, Goat willow, Grey willow. Broadleaved species will be planted in clumps of single species with conifer nurses throughout. Lodgepole Pine and Sitka Spruce will also be planted in small clumps but mixed in the well-tried triplex mixture. Planting densities should be high given the risk of exposure and should range from 1800 – 2000 stems per ha. Establishment success will be monitored and re-spacing undertaken as necessary. Detailed re-spacing stocking densities will be stated in any WGS submitted to FC.

Clear felling operations should be complete by 2006 and restock operations of clear felled areas complete by 2008. Any features created as part of the Objective 1 funding will be maintained and protected during these operations.

1a) Enhance the structural diversity of the forest

Implement a five-year rolling programme of restructuring the forest focusing on restock areas and existing "failed" areas using a variety of species and a variety of planting systems

Running concurrently with the clear felling and restocking operations will be a restructuring programme focused on the failed areas in C1 and C2. Restocking will focus on creating areas of woodland that have a mixed species composition. Emphasis will be placed on producing a clumped and uneven plant distribution bearing in mind prevailing wind direction and species mixtures, e.g., shade bearers will not be mixed with light demanders, unless for a specific purpose, e.g., nursing to a point when the shade bearer will be removed, Sycamore/Ash mixture. In general the restock will be based on a shelter wood system both regular and irregular, depending on the compartment/area within the forest. A priority will be to replant areas of shelterbelt that have died along the western boundary and are effectively the first line of defence from westerly and northwesterly gales.

1b) Safeguard the shelter wood and restock/restructured areas

Implement a wind throw monitoring programme

Regular monitoring visits will be made to the forest to determine the level of wind throw occurring and the future likelihood of damaging gales. Wind throw visits will occur every quarter and will focus on the mature standing timber as well as those areas, which are undergoing restructuring. Visits will intensify within the period November to May when the most damaging gales are likely to occur.

Emphasis will be put on days and times immediately following a gale. Areas that are used more heavily by the public will receive priority attention.

Implement a wind throw clearance programme based on monitoring programme, which focuses on the risk to the restock/restructured and shelter wood areas

Based on the monitoring visits a wind throw clearance contract will be established which will aim to clear wind throw damage as and when it occurs over the five year period. Trees overhanging or obstructing or likely to obstruct paths and tracks or areas of public amenity will be dealt with as a priority. Additionally any trees falling on to restock areas or extraction routes will also be cleared. However, wind throw in areas where felling is due to take place that does not affect public access or does not present an immediate problem will be left for normal harvesting operations to deal with.

Protect young saplings from grazing pressure

Newly planted trees will be protected in areas of high rabbit populations through the combined use of spiral guards held in place with bamboo canes and 60cm tubes and stakes. Elsewhere trees will be monitored for evidence of deer browsing pressure and depending on the size of the problem (if any) a strategy will be adopted based on either culling, protection with stakes and netting or fencing small areas off.

1c) Safeguard shelterbelt on western boundary

Create a new post and rail fence along the western edge of the forest adjacent to the road

A new post and rail fence will be erected along the roadside along the western edge of C1. This will create shelter for new trees and shrubs planted to maintain and replace dead sections of shelterbelt crucial to the sustainable management of the forest. The community will explore the possibility of using some of the timber extracted during felling for the fencing materials required. Hire of a mobile sawmill will also be explored.

1d) Discourage and aim to prevent the entry of stock into the forest

Repair and maintain all boundary fences to a stock proof standard

A comprehensive survey will be undertaken of all perimeter fences and a programme of repair, upgrade, renewal and maintenance will be implemented in consultation with neighbouring landowners. Priority will be given to Eastern and Northern boundaries.

1e) Safeguard and maintain features funded under Objective 1

Employ contractor

A contractor will be employed to undertake the minimum requirements connected with the maintenance of Objective 1 features within the forest. However it is likely that this provision will be part of a broader remit to implement the work identified in this plan.

Survey and repair any damage

Objective 1 features will be periodically monitored for signs of wear and damage, using recording sheets and where applicable fixed angle photographs. Reports detailing maintenance required will be produced.

Incorporate requirements for obj 1 funded works into active management prescriptions

Work identified and resulting from the monitoring and recording work detailed above will be incorporated into the work schedule for any contractor employed to undertake other maintenance work within the forest.

SHELTER BELT IN C1. WESTERN BOUNDARY/EASTERN SIDE

The shelter belt along part of the western boundary has formed a valuable windbreak for the forest and should be maintained as a matter of priority. It consists in the main of Pinus mugo Mountain Pine. Note comparison to photo of Western side (closest to the sea).

WESTERN BOUNDARY/WESTERN SIDE

2) Rely more heavily on locally sourced and grown stock

Create a tree nursery focusing on the production of material sourced from the forest and its environs

A small tree nursery constructed with the help of local schoolchildren will be established within the forest. Seed will be collected locally and grown on for amenity and small-scale plantings within the forest. The schools and any local interest group (WATCH) will be encouraged to become involved.

3) Enhance the conservation interest of the site

Leave the open "failed" areas at the eastern extremity of C3 unplanted with trees. Replace felled and any wind thrown timber with shrubs

This area of the forest should retain its different structure and composition to the rest of the forest in that it should remain open and serve as a different habitat for wildlife to use. However areas of standing timber will be felled and replaced with shrub species providing some shelter from Easterly gales and creating nesting potential and cover for songbirds. Similarly recreational facilities will not be provided within this area and disturbance will be kept down to a minimum.

Create ever-widening glades within "failed" areas elsewhere with a structured ecotone to the glade edges

A number of small glades will be cut into the failed areas marked on map. The western edge of these glades will be planted with broadleaved shrubs shortly after the glade is created. The glades will be gradually increased in size on an annual basis and a mixture of species both coniferous and broadleaved will be planted on a wide spacing within the glades effectively restructuring these areas of forest over a ten year period. The glades will vary in size from a quarter of a hectare to a half a hectare and will start in isolation from one another. By the end of the ten-year period several glades will have been created and connected through a series of rides and paths creating a forest/habitat network within the forest. The forest as a whole will have been completely restructured by year 10 and consist of a number of glades with shrub and tree species on a wide spacing combined with a number of areas of woodland of mixed species on a tighter spacing.

Clear trees away from burn edges to create 50% dappled shade

This prescription will be incorporated both in areas where new glades are being created and where the restocking is taking place. In the small areas where broadleaves dominate the burn edges a percentage will be coppiced and allowed to regrow adding structural and ecological diversity to the burn edge.

Create a graded ecotone to forest paths and rides using shrubs

As the restocking takes place a new path network will be developed the edges of which will be planted with shrub and lower growing tree species providing a graded forest edge maximising shelter and opportunities for wildlife. The edges will be broken and will curve in and out of the woodland maximising surface area of the edge effect. As much use will be made as possible of flowering shrubs and nectar producing species e.g., Bramble, as possible on the northern edges of rides and paths to encourage butterfly species.

Monitor and regulate if necessary rabbit grazing to maintain the areas of species rich grassland

The rabbit population in compartment 1 is an important tool in the maintenance of the unimproved species rich grassland present. Species like Mountain Everlasting benefit from the current rabbit-grazing regime. However if grazing levels become too intense a degree of control or protection from the grazing may be necessary. A number of fixed-point quadrats will be established to monitor vegetation and some fixed point photos taken and repeated at regular intervals near rabbit warrens to monitor amount and/or increase in burrowing.

DUNNET FOREST MAIN RIDE AND VISTA

The main ride and vista running East/West throughout the forest has become a valued feature which is now under threat from windthrow. Felling and restructuring of this part of the forest to be handled sensitively. Some smaller trees are included in both rows and through a structured approach to felling operations, impact on the landscape should be reduced.

4) Promote the forest as an educational and interpretative resource

Cement established contacts with schools, make new ones and foster awareness of the forest as an educational resource

There are schools in the immediate area of Dunnet and Castletown. Existing contacts with these schools will be developed and involvement with the forest both on and off site (within the school classroom) will be encouraged. Further links with primary schools in Thurso and Wick will be established and the forest will effectively be marketed as a place to undertake environmental education. A small flyer for teachers will be produced extolling the virtues of the forest and main points of contact, which will be sent to the schools concerned.

Establish a forest events programme promoted locally and further afield

A Dunnet Forest events programme will be produced annually consisting of guided walks, recreational events, family activities, social activities etc. This will be published at the beginning of 2002 and thereafter annually. The emphasis will be on informality and the number of events will be anything from 6 to 12 per annum. Different interest groups will feed into this programme and use it as part of their own programme of events.

Network information on the forest and promote it as a demonstration community woodland for other community groups and agencies

The group will use existing mechanisms, e.g., NHFT's community forest forum, Reforesting Scotland's network and their own contacts to promote and inform other groups and agencies of the work they are undertaking. Any specific activities the group undertake within the forest that may have some demonstration potential will be marketed to a wider audience, e.g., Caithness and Sutherland.

Working in equal partnership with SNH develop and implement an educational use programme/plan for the forest

An existing educational plan developed between SNH Inverness and the local area office (Golspie) has been produced for the forest. This will be developed with representatives of the Dunnet forest steering group and mark the beginning of a formal educational strategy partnership between SNH and the community group.

Enhance and improve facilities around the wetland and the hide

This area will be developed as a wildlife interpretation area. Information and interpretation within the hide will be reviewed and developed. Tree tubes and stakes will be removed from recently planted broadleaves that are now established as part of an ongoing programme of removing old tubes, stakes and ties from well established trees throughout the forest. Further management of the pond itself will be considered and the possibilities of further scrapes, vegetation management and the provision of flight lines to and from the pond will be reviewed as part of the Forest steering group/SNH partnership.

5) Promote responsible use of the site

Implement a membership drive to attract new members to the forest group and encourage regular discussion and feedback from the membership and wider public

A membership recruitment drive will be implemented before the end of 2001. This will take the form of advertisements in the local paper followed by the production of a small flyer with membership form incorporated. This will be produced in house and photocopied and distributed to a variety of outlets in both the immediate area and slightly further afield, e.g., Thurso. As the membership increases meetings will encourage the feedback and input from new members to the development of the wood.

Form a recreational sub-group which brings together all the interests

A small sub-group will be formed in 2002, which will aim to bring representatives of all the current and potential recreational users of the forest together in order to develop a recreational strategy for the

forest. This will act as a forum where problems, opportunities and solutions can be discussed openly and constructively.

Zone the forest either spatially, temporally or both in order compromise is reached and as far as possible all groups are catered for

Zonation of the forest in some way for recreational use will be an early task of the recreational sub-group. In this way recreational users will be safeguarded from potential problems of conflict within the forest and areas of the forest best suited for the differing uses can be identified and utilised.

Make recreational maps widely available

New maps illustrating zones, routes and further sources of information will be produced before the end of 2002 and made available to anyone using the forest. The forest will not be marketed off-site as a formal recreational resource other than through word of mouth.

Implement footpath, track and recreational facilities survey including the feasibility of a perimeter path

An inventory of all the recreational facilities including paths, tracks, picnic tables, boardwalks, their state and condition and any required maintenance will be produced before the end of 2002. Much use will be made of the past recreational plan produced by IMF forestry. A survey of the surface, drainage, vegetation and obstructions of the perimeter of the forest will be undertaken to determine its suitability for a perimeter footpath. An outline specification (if applicable) will be discussed and costed in partnership with SNH.

HABITAT/SPECIES MANAGEMENT

This small area close to the surfaced path in C1 includes a single specimen of Juniper. The surrounding area is heavily grazed by rabbits and so a small exclosure was created to safeguard the Juniper and a small interpretive plaque was positioned (bottom right) to explain the need for the fence. This localised form of habitat/species management is likely to play an important role in the future management of other areas in the forest.

6) Consolidate the status of the Community Forest Steering Group

Following consultation with DBI seek charitable status for the group

Dunnet Bay Initiative's current constitution does not include charitable status. The group will amend their memorandum and articles before the end of 2001 in order to apply to Inland Revenue for charitable status. Should this fail the group will consider other means, e.g., a separate constitution for the forest group itself apart from DBI.

Assess potential for training in forest skills and identify relevant courses if appropriate

A skills audit of the group will be undertaken during 2002 during and following the membership drive to identify what skills the group possess and which if any, they would like to develop to facilitate the management of the forest. A list of training providers, courses and costs will be identified following the audit.

Include administrative costs in any funding application

Administration costs reflecting the time and work commitment of members of the group will be built into any future funding applications as a matter of course.

FINANCES

5.1 INCOME AND EXPENDITURE

All costs and income given must be seen as indicative and subject to change. No quotes have been obtained for any of the costs or income projections and the figures given therefore have been calculated from either, current rates for standard operations, averaged rates from the FC's standard list of operations and/or the experience of NHFT staff.

5.2 Costs

5.2.1 Selective thinning

Selective thinning based on either fell to waste or timber left in place and extracted in the following years felling programme or used for the forests' or communities' purposes. Costs are based on contractors' averages and FC's table of costs of operations in Highland.

Yr 1 – Selective thinning over 2.25 ha at approx. £400 per ha = £900

Yr 2- Selective thinning over 2.25 ha at approx. £400 per ha = £900

Yr 3 – Selective thinning over 1.5ha at approx. £400 per ha = £600

Yr 4 – Selective thinning over 0.75ha at approx. £400 per ha = £300

TOTAL COSTS OF SELECTIVE THINNING PROGRAMME = £2700

5.2.2 Glade creation

Felling with chainsaw small areas 0.1ha x 5 = 0.5ha/yr throughout zones identified for this form of management, see *Indicative silvicultural operations map.* Wood cut and stacked and later extracted for firewood or other community use, e.g., signs, chipping for footpath work, board walks/revetments.

Felling and stacking at approx. £450 per ha x 0.5ha = £225/yr

TOTAL COSTS FOR GLADE CREATION = £1125

5.2.3 Restocking

Based on an overall stocking density of 1800 stems per ha, minimum cultivation, i.e., direct planting, no fertiliser requirements. Some protection against rabbits and voles will be required depending on which compartment is being planted. Costs are based on 50/50 mix of conifers to broadleaves and are therefore averaged. All plants will be dipped for weevil protection.

Yr 2 (first clear fell area) restock 8.75 ha @ 1800 stems (20-40cm) per ha @ approx.0.40p per tree (supplied and planted) = £720 per ha x 8.75 = £6300

Rabbit protection (mini tubes and stakes) @ approx. 0.50p for approx. 1.5ha plus fitting @ approx.0.3p per tree = £1350 + £81 = £1431

Vole guards @ approx. 0.15p for approx. 1.5ha = £405

Supplementary spraying for weevils @ £60 per ha = £525

Total costs of restock in year 2= £8661

Yr 3 restock 8.0ha @ 1800 stems (20-40cm) per ha @ approx. 0.40p per tree (supplied and planted) = £720 per ha x 8.0 = £5760
Supplementary spraying for weevils @ £60 per ha = £480

Total costs of restock in year 3= £6240

Yr 4 restock 6.5ha @ 1800 stems (20-40cm) per ha @ approx. 0.40p per tree (supplied and planted) = £720 per ha x 6.5 = £4680

Vole guards @ approx. 0.15p for approx. 1ha = £270

Supplementary spraying for weevils @ £60 per ha = £390

Total costs of restock in year 4= £5340

Yr 5 restock 3.5ha @ 1800 stems (20-40cm) per ha @ approx. 0.40p per tree (supplied and planted) = £720 per ha x 3.5 = £2520

Supplementary spraying for weevils @ £60 per ha = £210

Total costs of restock in year 5= £2730

5.2.4 Thickening up and under planting in the glades at the rate of 1400 stems per ha for 0.25 ha (x 25% area of glades created) x 5 years = 350 trees @ approx.0.40p per tree = £140/yr

Supplementary spraying for weevils @ £60 per ha = £60

Total costs of glade planting over 5 year period = £760

5.2.5 Thickening up shelter belt in C1

Planting at the rate of 2000 stems per ha in and around existing shelter belt over approx. 1.5ha with mini tubes and stakes = 3000 x 0.93p = £2790

Total costs of thickening up shelter belt in C1 = £2790

5.2.6 Beating up costs

Over the five year plan period based on 20% overall mortality = £5304.20

TOTAL PLANTING COSTS OVER 5 YEAR PLAN PERIOD = £31,825.20

5.2.7 Weeding (Spot treatment of glyphosate) at the rate of approx. £95 per ha. Treatment calculations and costs are based on the presumption weeding will necessary for three years in those areas where vegetation is most rank and competitive, i.e., the glades, (the failed areas) where coarse vegetation is already well established and the area in and around the shelterbelt where similar vegetation exists. In restock areas where vegetation has been suppressed by canopy closure only two years weeding is expected.

Yr 1 = 0.25ha (glades) + 1.5ha in and around shelter belt x £95 = £166.25
Yr 2 = 0.50ha (glades) + 1.5ha in and around shelter belt x £95 = £190
Yr 3 = 11.0ha (Restock, in and around shelter belt and glades) x £95 = £1045
Yr 4 = 19.0ha (Restock, in and around shelter belt and glades) x £95 = £1805
Yr 5 = 15.25 (Restock and glades) x £95 = £1448.75

TOTAL WEEDING COSTS = £4655

5.2.8 Fencing

Erect a new post and rail fence adjacent to roadside for approx. 420m @ £5.75 per m = £2415
Repair Eastern boundary fence to stock proof specification for 940m @ approx. £2 per m = £1880
Repair Northern boundary fence to stock proof specification for 1080m @ approx. £2 per m = £2160
Repair Western boundary fence to stock proof specification for 370m @ approx. £2 per m = £740

TOTAL FENCING COSTS = £7195

5.3 INCOME

5.3.1 Felling income

The current prices for standing timber of the quality found at Dunnet has been variously stated as being between £1 to £2 per ton. However, in many instances timber of this kind has been almost given away in order to insure management of the forest continues. Therefore any prices estimated here should be seen as absolute maximums given the current state of the market and the actual amounts realised from any felling programme could be much less. On the basis that $1m^3$ is roughly equivalent to 1 ton:

Felling coupes – **Yr 1** = 8.75ha x $244m^3$ /ha = $2143m^3$ (tons) at £1 per ton = £2143
Felling coupes – **Yr 2** = 8.00ha x $244m^3$/ha = $1952m^3$ (tons) at £1 per ton = £1952
Felling coupes – **Yr 3** = 6.5ha x $244m^3$/ha = $1586m^3$ (tons) at £1 per ton = £1586
Felling coupes – **Yr 4** = 3.5ha x $244m^3$/ha = $854m^3$ (tons) at £1 per ton = £854

TOTAL INCOME FROM TIMBER = £6535 (max)

5.3.2 Woodland Grant Scheme (WGS)

Yr 2
Restocking grant @ £525 per ha for 4 ha (broadleaves) and £325 per ha for 4.75ha (conifers) = £2100 + £1543.75 = 3643.75
Restocking grant @ £525 per ha for 0.75ha and £325 per ha for 0.75ha (shelterbelt area) =£393.75 + £243.75 = £637.50
Restocking grant @ £525 per ha for 0.25ha (glade areas) = £131.25

Total restock grant in Yr 2 = £4412.50

Yr 3
Restocking grant @ £525 per ha for 4 ha (broadleaves) and £325 per ha for 4.00ha (conifers) = £2100 + £1300 = £3400
Restocking grant @ £525 per ha for 0.25ha = £131.25

Total restock grant in Yr 3 = £3531.25

Yr 4
Restocking grant @ £525 per ha for 3 ha (broadleaves) and £325 per ha for 3.5ha (conifers) = £1575 + £1137.50 = £2712.50
Restocking grant @ £525 per ha for 0.25ha = £131.25

Total restock grant in Yr 4 = £2843.75

Yr 5
Restocking grant @ £525 per ha for 1.75 ha (broadleaves) and £325 per ha for 1.75ha (conifers) = £918.75 + £568.75 = £1487.50
Restocking grant @ £525 per ha for 0.25ha = £131.25

Total restock grant in Yr 5 = £1618.75

Total restock grant for 5 year plan period = £12,406.25

TOTAL INCOME FOR 5 YEAR PLAN PERIOD	**£18,941.25**
TOTAL COSTS FOR 5 YEAR PLAN PERIOD	**£47,500.20**

These figures do not include the costs of a rapid reaction policy to deal with any wind throw occurring over the period. It would be unrealistic to cost this when the variables are so great. Additionally the cost of a footpath survey for the property has not been costed. Prices for this kind of work vary enormously and it is likely that this would be tendered.

5.4 ADDITIONAL SOURCES OF INCOME

Further WGS grant aid will be accessible but will depend on what additional work is carried out, e.g., management work relating to the footpaths, monitoring, and any thinning operations will attract Annual Management Grant (AMG) at the rate of £35 per ha/yr for the five year period. If this were secured for one third of the area this would bring an additional income of £1050 for 30 ha for the next five years.

Additionally it would be possible to apply for a Woodland Improvement Grant (WIG) for any management works not already covered by the supplements used above. This will cover up to 50% of agreed costs.

It is likely funding will also be available from other public bodies, e.g., CASE, SNH and Highland council through their community involvement programme and the Landfill Tax credits grants (ENTRUST). In addition to public money DBI (as a constituted community based organisation) will be able to source other private trust and lottery funding, e.g., National Lottery Charities Board, Scottish Land Fund, Heritage Lottery Fund. Charitable recognition will facilitate this and open doors to further sources of funding.

The group should also explore local sources of funding and UKAEA and Norfrost have both been suggested. Finally the group could undertake its own fundraising events, which would attract matching funding.

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Appendix 1: Tree species planted in the 1950s

Corsican Pine	Lodgepole Pine	Sitka Spruce	Mountain Pine
Scots Pine	European Larch	Japanese Larch	Noble Fir
Austrian Pine	Monkey Puzzle	Maple	Western Red Cedar
Lawson Cypress	Western Hemlock	Poplar	Cotoneaster
Birch	Elder	Red Oak	Beech	Ash
Snowberry	Sycamore	Sea Buckthorn	Dwarf Mountain Pine

Dunnet Forest - Design by Rebecca Davies, P1 Castletown Primary School

Appendix 2: Trees present in the forest in 2001 in order of dominance:

Lodgepole Pine

Mountain Pine

Sitka Spruce

Corsican Pine

Sycamore

Sea Buckthorn

Birch

Scots Pine

Cotoneaster

Alder

Willow

Rowan

Hazel

Juniper

Design by Cassy Birkhauser, P5 Castletown Primary School

Appendix 3: Bird species:

Grey Heron
Mallard
Teal
Hen Harrier
Sparrowhawk
Buzzard
Kestrel
Moorhen
Snipe
Woodcock
Redshank
Woodpigeon
Cuckoo
Long-eared Owl
Wren
Dunnock
Robin
Blackbird
Fieldfare
Songthrush
Redwing
Willow Warbler
Goldcrest
Spotted Flycatcher
Pied Flycatcher
Coal Tit
Blue Tit
Great Tit
Tree Creeper
Jackdaw
Carrion Crow
Starling
Chaffinch
Greenfinch
Goldfinch
Bullfinch
Siskin
Redpoll
Crossbill

Design by Marc Pollard, P6 Castletown Primary School

Appendix 4: Macro fungi:

Lactarius deliciosus
Lactarius rufus
Lactarius mitissimus
Lactarius glyciosmus
Lactarius dterimus
Lactarius torminosus

Russula sardonii
Rusla emitica
Russula ochroleuca

Agaricus silvicola

Leccinum scabrum
Leccinum versipelle

Suillius luteus
Suilleus granulatus

Gyroporus cyanescens

Gomphidius glutinosus

Laccaria amathystea
Laccaria laccata

Lepista nuda et al

Tricholomopsis rutilans
Collybia maculata

Marasmius androsacius et al

Mycena sps

Hygrophoropsis sps

Cortinareaceae sps

Pholiota flammens

Hypholoma fasciculare

Ganoderma applanayum

Thelephora terrestris

Lycoperdon perlatum

Heterobasidium annosum

Clitocybe sps

Inocybe sps

Appendix 5: Flowering plants:

The following is a list of the main species of flowering plants and is by no means exhaustive.

Dry machair area in main ride and western clearings

Eyebright *Euphrasia officianalis*
Cat`s foot *Antennaria dioica*
Purging flax *Linum catharticum*
Bird`s foot trefoil *Lotus corniculatus*
Scottish primrose *Primula Scotica*
Northern felwort *Gentianella amarella ssp septentrionalis*
Thyme *Thymus praecox*
Creeping Willow *Salix repens*

Damper areas

Marsh lousewort *Pedicularis palustris*
Butterwort *Pinguicula vulgaris*
Meadowsweet *Filipendula ulmaria*
Northern marsh orchid *Dactylorhiza purpurella*
Fragrant orchid *Gymnadenia conopsea*
Watermint *Mentha aquatica*
Ladies smock *Cardamine pretensis*

Wetlands

Marsh marigold *Caltha palustris*
Watercrowsfoot *Ranunculus aquatilis*
Water forget.me.not *Mysotis scorpioides*
Watercress *Narsturtium officianale*
Bogbean *Myanthes trifoliata*
Lesser spearwort *Ranunculus flammula*
Yellow flag *Iris pseudacorus*

Neutral /acid soils inland

Heather *Calluna vulgaris*
Crowberry *Empetrum nigrum*
Mouse ear hawkweed *Hieracium pilosella*

LOGO DESIGNS BY CASTLETOWN PRIMARY SCHOOL

James Morrison P7

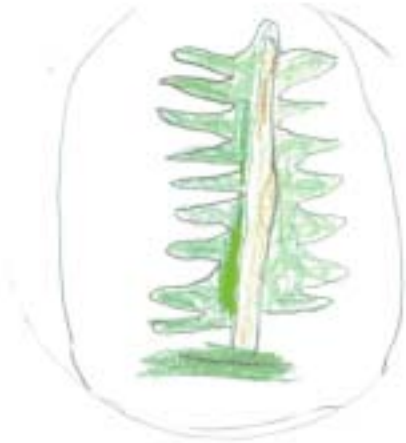
Charlene Geddes P7

Ashea Thornton P3

Jamie Redgate P7

LOGO DESIGNS BY CROSS ROADS PRIMARY SCHOOL

Sophie Robertson P1



Lucy Cairns P2

Alexander Bonham P4

Shane Udall P5

LOGO DESIGNS BY CROSS ROADS PRIMARY SCHOOL

Rachel Smith P7

Molly Marritt P7

Joze Hicks P5

James Ross P6