

APPENDIX 4

A Survey of Aspens on Dunnet Head in 2007 and 2009

By David Glass

A Survey of Aspens on Dunnet Head (by David Glass)

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http://www.caithness.org/caithnessfieldclub/bulletins/2008/survey_aspens_dunnet_head.htm)

INTRODUCTION

Dunnet Head might seem an improbable place to search for native woodland, but this windswept headland holds important remnants of the ancient Aspen woods.

Aspen *Populus tremula* occurs throughout Britain. In northern Scotland it survives mainly in small, isolated stands or refugia. Aspen was one of the earliest trees of the woodland which became established at the beginning of the Holocene Period as the ice retreated after the last glaciation. Colonisation took place from the continent (by the land bridge) and possibly from Ireland (by wind blown seed). It has also been conjectured that some Aspen survived the last glaciation in glacial *refugia* in the west highlands (as may have occurred in the case of Scots Pine *Pinus sylvestris*) but there is no conclusive evidence for this.

Aspen seldom flowers and rarely sets seed. Reproduction is normally vegetative through suckers growing from the roots of a parent tree. Accordingly a stand of Aspens may be composed entirely of clones of a single parent. Although flowering is now infrequent the pollen record indicates that Aspen were flowering profusely in the early-Holocene and indeed the spread of Aspen following the retreat of the ice could only have taken place through seed (Easton 1998).

Aspen is an important biodiversity resource. It is host to specialist species of fungi, lichens, bryophytes and invertebrates. Increased awareness of the important place of Aspen in Highland biodiversity led to the formation of the Highland Aspen Group, which aims to restore the tree to its rightful place in Scotland's boreal forest through research and the conservation of surviving stands (Highland Aspen Group, 2005).

In 2007 the North Highland Forest Trust embarked on a two-year Northern Aspen Woods Project, funded by the Highland Biodiversity Partnership. The project objectives are to gather information on the Aspen resource in Caithness and Sutherland, develop a supply of plants propagated from this resource and promote enhanced management of the surviving woods. The survey described in this report forms part of this project.

SURVEY METHOD

The 12 km of coastline from Dwarwick Pier to Brough Harbour was surveyed. The cliff edge and the flat ground adjacent, extending 10 metres from the cliff, were searched for Aspens. Wherever possible the cliff face and ledges were examined from an adjacent headland using binoculars.

For inland locations, only sites considered to have suitable characteristics for holding Aspens (south facing slope, shelter from wind) were selected for survey. Coverage of the inland area was not complete and it is possible that some refugia might have been missed.

For each location where Aspens were found the following information was recorded:

- Grid reference using GPS
- Description of situation
- General appearance of the trees
- Number of stems
- Length and diameter of the largest stem
- Whether suckers were present or not
- Evidence of flowering or fruiting
- Date of survey
- Photograph

Sites were recorded as individual locations where the trees on that site were separated by at least 50 metres from the nearest trees on another site. Although in more favourable habitat Aspens may produce suckers at greater distances than this, the assumption was made that the very small trees on Dunnet Head would not be capable of sustaining a root network extending more than 50 metres. Where 2 or more groups of trees were separated by less than this distance they were recorded as a single location.

At each location the number of stems was recorded to give a crude measurement of abundance. Number of stems equates to the number of individual plants that were not visibly connected to other plants. But of course, because of suckering, plants may be connected underground and may be part of the same organism. Number of stems was counted exactly where possible but was estimated where the number exceeded 100.

SURVEY RESULTS

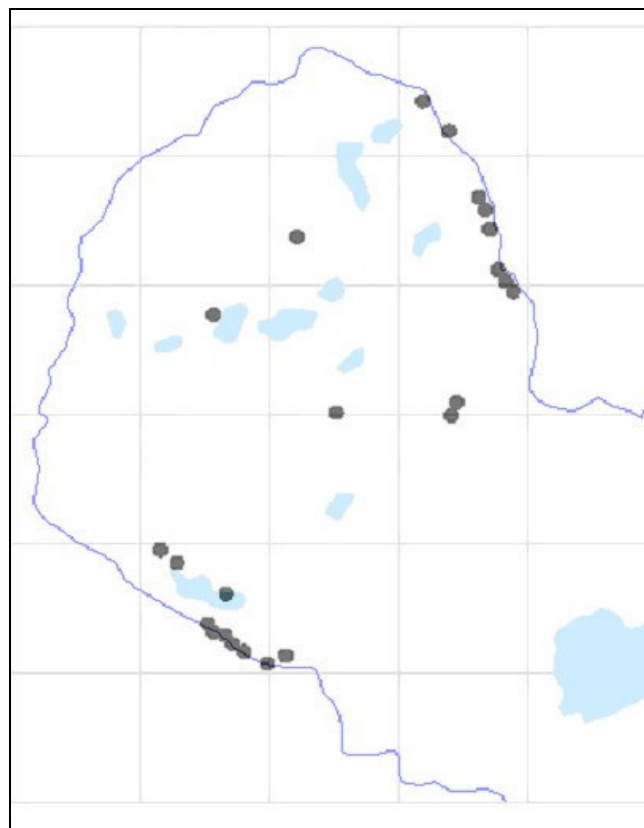
Aspens were recorded at 24 locations. Sixteen locations were on the coast and 8 were inland. (Table 1 and Figure 1).

Table 1. Aspen locations on Dunnet Head

Location	Grid Ref	No of Stems
<u>Coastal Locations</u>		
Peedie Sand	ND200720	~80
Head of Man	ND19921 72006	45
Head of Man	ND19748 72090	15
Head of Man	ND19654 72157	16
Rowrash Geo	ND19596 72219	~100
N of Rowrash Geo	ND19506 72244	~100
Stony Mouth	ND19467 72309	~30
Sows Geo	ND21126 76350	31
North of March Ditch	ND21328 76119	91
Meikle Score	ND21558 75614	19

Location	Grid Ref	No of Stems
Meikle Score	ND21600 75517	9
North of Little Score	ND21640 75364	40
North of Outer Sinigoe	ND21638 75365	27
South of Outer Sinigoe	ND21702/75056	1
Inner Sinigoe	ND21764 74965	37
North of Sinigoe	ND21821 74880	3
<u>Inland Locations</u>		
Loch of Bushta	ND19604 72543	~100
Loch of Bushta	ND19224 72787	~300
Loch of Bushta	ND19089 72885	2
Burifa Hill	ND20154 75308	14
Many Lochs	ND195747	18
Grassy Loch	ND20456 73939	~500
Courtfall	ND21345 73922	9
Courtfall	ND21382 74020	37

Figure 1: Locations of Aspen refugia on Dunnet Head
 (map produced by Mapmate using Digital Map Data © Bartholomew 2002)



Coastal locations holding Aspens were generally south-facing. Where Aspens were present at a geo, they were normally situated on the north side i.e. on a south-facing slope. Typically most stems were present as very small plants and suckers on the flat ground within 5 metres of the cliff edge (but extending up to 12 metres at some locations), with a few, larger and older plants on very steep ground just below the lip (Fig 2). The general impression was that these older trees were suckering out onto the flat ground where the suckers do not grow to any size because of exposure to wind or other inhibiting factors. Where trees were found on the cliff face they were always in situations where there was an unbroken covering of soil connected to the flat above. No trees were observed on ledges which did not have a soil connection to the top of the cliff.

Inland locations were typically on steep south-facing slopes with exposed boulders. At all inland locations the Aspens were growing among bracken *Pteridium aquilinum* or deep heather *Calluna vulgaris* and in many cases were partly concealed by this vegetation.

Suckers were observed at all but 4 of the locations. No evidence of flowering or fruiting was found at any location.

At most locations the trees were small (generally less than one metre in height) and of stunted appearance. Substantial trees having the characteristic Aspen shape (upright with long slender bole) were found only at Courtfall (up to 3 metres tall) (Fig 3) and at Burifa Hill (one dead tree 1.6 metres tall).

Fig 2 Clifftop Aspen near Outer Sinigoe



Fig 3 Inland Aspen at Courtfall



DISCUSSION

Current status of Aspen on Dunnet Head

The Aspen refugia recorded in this survey, together with scattered Juniper *Juniperus communis* and Willow species, are the only survivors of the pockets of scrub woodland which must once have existed on Dunnet Head. Formation of peat and, later, the influence of man through grazing animals and muirburn probably caused Aspen to be confined to the cliff edge and a few inland locations.

In the early Holocene there would have been abundant wind borne seed to replenish the Dunnet Head woodlands. Even after Aspens ceased flowering regularly there may have been sufficient seeding events, over time, for new seedlings to become established. However these seeding opportunities must have diminished as Aspen colonies elsewhere in Caithness became fewer due to the influence of man. The nearest substantial stands of Aspen are now in Dunbeath Strath although there are small refugia at Dirlot, Westerdale, Thurso and Bridge of Westfield. The nearest known location is at Scarfiskerry (ND266746) where there are a small number of very stunted Aspen in a geo. The possibility of seed reaching Dunnet Head from rare seeding events at these locations must now be remote indeed. The fact that no Aspens were observed on isolated cliff ledges supports the proposition that seeding has not taken place in recent times.

The Aspen colonies on Dunnet Head have probably been in decline for a very long period. This survey has shown that they are now confined to 2 stretches of clifftop (west of Dwarwick and east of the lighthouse) and isolated inland locations at Loch of Bushta, Burifa Hill, Many Lochs and Courtfall. Aspens were recorded at Dwarwick Head

(ND205713) by Scottish Natural Heritage in 1983 but were not found during this survey, indicating that extinction at that location has taken place since then.

In recent years grazing of sheep on Dunnet Head has reduced and most areas are now ungrazed. The incidence of damaging muirburn, once frequent, has also decreased. While sheep grazing has declined, the population of Roe Deer *Capreolus capreolus* has increased and this may now pose the main threat to the Dunnet Head Aspens. Roe Deer are concentrated in the Courtfall area and the Moss of Brough but they range over the whole of Dunnet Head. They also forage on the adjacent croft lands of Brough and Dunnet where it has been found that when trees are planted, many will be destroyed unless protected from deer. It is likely that the native Aspens (which are highly palatable to grazing animals) must suffer in the same way.

Potential conservation measures: Each of the clifftop refugia contains a nucleus of trees which are inaccessible to deer. In most cases suckers are present on the flat above the cliff but these evidently fail to grow into mature trees. This may be due to factors such as exposure to wind or it may be due to deer. It would be valuable to protect samples of suckers by tree guards or small fenced enclosures in order to determine whether grazing is the inhibiting factor.

The inland refugia must be considered particularly vulnerable since the trees are accessible to grazing animals. The inland refugia that still exist must have survived sheep grazing and muirburn over many years but there is no way of knowing how many have been lost. Again it would be useful to investigate the effect of deer protection on sample plots. Finally it would be beneficial to create a source of native aspen for planting locally, by propagation from root cuttings of the Dunnet Head clones. It is hoped that this can be done as part of the Northern Aspen Woods Project.

ACKNOWLEDGEMENTS

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REFERENCES

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ADDENDUM

REVIEW OF FIRE DAMAGE AT DUNNET HEAD JULY 2009

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On 14th April 2009 a fire broke out on the southern part of the headland near Brough. Despite the efforts of fire crews the fire continued to burn for 6 days and damaged some 700 acres.

Reportedly over one quarter of the Dunnet cliffs SSSI has been affected, and overall the consequences for nesting birds and especially for the vegetation of the headland have been severe. Recovery of vegetation will be very slow indeed in such exposed conditions.

On 8th July a visit was made to review the condition of the Dunnet Head aspen stands. Of the 24 known Aspen refugia on Dunnet Head, 8 are in the fire area. They are:

ND19597221 Rowrash Geo (SSSI)
ND19507224 North of Rowrash Geo (SSSI)
ND19467230 Stony Mouth (SSSI)
ND19607254 Loch of Bushta East
ND19227278 Loch of Bushta West
ND19087288 Loch of Bushta North
ND195747 Many Lochs
ND20457393 Grassy Loch

In 2007 there were only 2 small trees at Loch of Bushta North. These can no longer be found and there are no new suckers. It seems that this colony perished in the fire and is now extinct. It is thought that the 2 trees were a surviving fragment of the Loch of Bushta West clone, left behind as LBW contracted under pressure from grazing and burning.

At each of the other 7 locations all of the old trees have either been consumed by fire or are scorched and dead.

No remains of pre-2009 ramets are visible and they must have been consumed entirely.

At all of these 7 locations there are numerous ramets which have grown rapidly since the fire - several hundred at some locations - and very visible on the bare ground.

It is concluded that this is just another episode in a process of gradual decline which has probably been going on for a long time on Dunnet Head. Adverse events like fires will extinguish small, peripheral colonies which have limited underground reserves, while the larger colonies suffer a setback but survive. In the (presumed) absence of seed production the process is irreversible and new colonies cannot be established to replace those that have been lost.

18 ramets have been tagged at Courtfall (not affected by the fire) in order to monitor browsing by Roe Deer. One year's observation indicates that loss of the tips by browsing is pretty general at that location.