

CULBIN SECTION LAIGH OF MORAY FOREST
PROTECTION OF FORESHORE

Winter 1973/75?

1. CULBIN FOREST

- (27) The Culbin Forest covering an area of 7 740 acres (3 120 ha) adjoins the Moray Firth just west of the estuary of the River Findhorn. The first area of this forest to be acquired by the Commission was 3 500 acres of unstable sandhills feued from Mr Grant of Glenmoriston in 1923. This was subsequently stabilised by thatching with branches of trees and planting with Scots and Corsican pine.

No. The area formed part of the original Barony of Culbin, a strip of agricultural and pasture land on which stood the laird's house (traditionally supposed to be beneath the large sandhill known as Lady Culbin) and sixteen farm steads. Large accumulations of sand brought down by the River Findhorn were built up near its mouth over the centuries and in 1694, according to local accounts, a series of ~~easterly~~ westerly gales drifted this sand over the adjoining fields engulfing the buildings and covering up the agricultural area. It is thought that the gathering of marram grass by the local people for thatching their houses was to some extent responsible for making the original sandhills unstable and this was forbidden by an Act passed by the Scottish Parliament in 1695. The Findhorn River itself which originally flowed in a westerly direction along a course parallel to the shore, broke through in direct line into the sea destroying the original Fishing village of Findhorn which was on its seaward bank. The village was rebuilt on the eastern side of the estuary. The whole area was at one time below sea level, the 25' 0" contour roughly marking the original coast line. It appears to have lifted and in part to have been built up by littoral deposits. There are extensive raised stone beaches in the central area of the forest.

(11)

2. PLANTING

- (3) A number of early efforts to control the sandhills by planting are on record by Grant of Kincorth 1839, by Grigor of Forres for the Moy Estates in 1840-42 of 300 acres of Scots pine and Larch. In 1865 we have the first record of thatching the sandhills with tops of thinnings. Between 1870 and 1913 the Chadwicks of Binsness planted Corsican pine to protect their land from sandblow. The Commission's activities began in 1922 and the whole area is now afforested.

3. EROSION OF SHORELINE

- (26) The whole shoreline was pushed seawards by the great storms of 1694 and the old
(24) river course filled in. Any erosion of the foreshore was made up by replenish-
(L) ment of sand by the prevailing south westerly winds from the sandhills in the
(12) hinterland. The thatching of the sandhills and planting put an end to this
source of material, and after 1950 serious erosion began. By 1968 a depth of
(13) 200 feet had been lost and about 30' 0" per annum was the average rate of
erosion.

4. PROTECTION MEASURES

In 1968 the problem had become acute and a pilot protection scheme was drawn up. An unsuccessful attempt was made to interest the Moray County Council as Coast Protection Authority in the Scheme and finally the Commission went ahead with their first scheme in September of that year.

- (C) The foreshore consists of a sandy beach, constantly varying in level, backed by high sandhills which were being regularly eroded at the base by high tides particularly during north easterly gales. The first scheme was to provide 9

- (A) permeable groynes varying between 80 yards and 25 yards in length on a long and short pattern, the groynes being spaced at approximately 80 yard intervals. The permeable groyne pattern was chosen to allow a slowing down of the longshore current (which always flows westward, but more strongly on the flood tide) and so allow deposit of the sand carried by the water. By using upright piles with 3" - 4" openings no sudden drop occurs in the beach line. In addition to the groynes wave screens consisting of posts at 2' 0" intervals with a waling fixed 6" above shore level were constructed along the front of the sandhills parallel to the shore. These broke the force of the waves and collected sand on the landward side. Experience shows that they are most effective about 15' 0" from the foot of the sandhills. While we experienced excellent results in the way of sand build up both with the groynes and wavescreens, as they only had a length of 6' 0", with 3' 0" buried in the sand they were very vulnerable to damage if a storm suddenly lowered the shore level, and this was particularly the case with the groynes. The Moray Fisheries asked for ramps to be constructed over the groynes to allow their fisheries tractor to pass over. In subsequent schemes this was not found necessary.

Early in 1969 we undertook repairs to the groynes damaged in a bad storm which occurred on 14/15 December 1968. The original piles were 6' 0" lengths of larch from Monaghty Forest. As pine was shown to be practically as long lasting in marine conditions, the new piles were 8' 0" lengths of pine from Culbin. The stool pattern of stiffener was found unsatisfactory as having the effect of working the piles out of the beach if any movement took place and landties were substituted.

- (30) By 1970 further damage had been done to the straight type groynes particularly the exposed ends and the design was modified to include a zig zag pattern end.
(F) This was a great improvement on previous types and in addition to improving
(29) the strength it also had the effect of breaking wave forces and provided a
(31) better trap for sand.

- (M)(G) Experience with the groynes shows that the shore tends to build up in long
(H) tongues or bars from the end of a groyne stretching out westward. The slack
(J) behind slowly fills in while conditions are favourable. These conditions continue so long as the waves are oscillatory in character. Under surf conditions (ie: when the following wave begins to break before the first has finished its uprush) a sandy shore is eroded and however good the build up loss will occur. It follows therefore that every effort must be made to encourage accretion so that when erosion takes place there should be some positive balance to allow for this. We found that very long groynes were not necessary as the area of this foreshore near the foot of the dunes is the part needing to be protected by groynes at most 25 m in length, with shorter ones between, together with wave screens. At the exposed, ie the eastern, end of the system two extra short groynes were put in to give protection to the first long groyne of the series with good results. A hard toe consisting of a gabion groyne was placed at the seaward end of the first long groyne to increase its resistance to erosion. A short gabion groyne was also provided near exposed sandhills at Shalloch head which has checked the wave attack at this point and helped to gather sand.

(K)(Q)

The method of establishing the groynes was to dig a trench, pitch the piles in line and refill bolting on walings afterwards. 12' 0" piles are provided at the corners of zig zags and these are placed in with the 8' 0" normal piles in the 5' 0" deep trench. After the walings are in position these anchor piles are driven into the shore until the tops are level with the normal piles. Driving the whole way was found a mistake as piles tend to go

badly out of line. There has been hardly any loss to the shore line since 1968.

The costs up to date are as follows.

	£
Pilot scheme - 9 groynes (1968)	£ 589
Repairs and 2 extra groynes (March 1969)	986
Reconstruction with zig zags - 13 groynes (March 1971)	£ 263.
Repairs (March 1972)	968
6 new groynes and gabion (January 1973)	2 209
Gabion groynes in Muckle Burn (January 1968)	2 107
Additional groyne (September 1970)	£££

(R) Other experiments have been undertaken in attempting to trap wind blown sand
(S) which might otherwise be lost during warm windy weather. Broplane mesh has
(T) been fixed on various types of framework and on the groynes themselves. One
(V) of the most successful applications was horizontal mesh 6" above the surface
on a peg and wire frame in 15' 0" squares. This gave excellent sand capture
and has been employed at Burghead on a reclamation scheme.

(36) Another successful scheme was the use of Maccaferri gabions galvanised and
plastic covered to provide groynes to protect a curve in the banks of the
Muckle Burn from erosion. The bank was being steadily undercut and sand
slipping into the deep channel. The groynes have kept the channel away from
(W) the bank and although the end groyne was washed away in a heavy spate it has
since been replaced and the bank saved from any further erosion since 1968.
Slight accretion has in fact occurred.