

**Coastal Assessment Survey
For Historic Scotland**

*Fife -
Fife Ness to Newburgh*



JANUARY 1997

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1.0 INTRODUCTION

A field survey of the North Fife coastline was undertaken over a period of 11 days in October 1996. The coastline under examination extends from Fife Ness to the Fife boundary just west of Newburgh, a survey section approximately 70 km in length. The coastline encompasses part of the major estuary of the River Tay and the smaller estuary of the River Eden. The survey was carried out to the specification *A Procedure For Coastal Assessment Surveys Funded By Historic Scotland* (version 1.6), hereafter referred to as "the Procedures". Notifications of any variations from the Procedures are made clear in the relevant section of this report.

The aim of the survey was to carry out a rapid assessment of the impact of coastal erosion on the archaeological sites in the coastal zone and to identify any unrecorded archaeological sites. A period of research into documentary sources and aerial photographs was followed by an 11 day field survey carried out by one team of three fieldwalkers comprising an archaeologist, geologist, and photographer. The survey was carried out to coincide with low water periods and all records were plotted onto Ordnance Survey (hereafter 'O.S.') 1:25,000 Pathfinder maps which have also been used as the base maps for this report. All field positions were derived by a handheld G.P.S. unit to an estimated accuracy of between 30-100 metres depending on signal strength. The survey team achieved almost complete coverage of the foreshore, coast edge and hinterland (up to 100 metres from the coast edge). However, recording of the coast edge adjacent to Leuchars R.A.F. base was limited due to M.O.D. restrictions.

For the purposes of description, the survey area can be split into the following physically distinct sections.

From Fife Ness to St Andrews, a rock platform composed of Carboniferous rocks dominates the foreshore, with fringing sand and shingle beaches existing most notably at Balcomie and Cambo Sands and at other points where breaks in the rock platform have allowed sand to accumulate. Those monuments which have survived on this hard rock foreshore tend to be fairly recent and substantial such as Fife Ness harbour (NO60NW33.0: site description 1), the lighthouse construction site (NO60NW33.1: site description 1) and Kingsbarns harbour (NO61SW11: site description 2). The exposed location of these sites means that even these substantial features are experiencing substantial erosion and they will not survive in the long term. Behind the isolated sandy beaches, dune ridges can be seen at the coast edge and the hinterland consists of blown sand deposits accumulating in structural lows which intersperse resistant rock headlands. At these points, a raised beach rises as a gentle escarpment some distance behind the coast edge. The presence of sand deposits provides a more favourable burial environment for archaeological remains but few monuments were identified. Elsewhere, the former shoreline is close to the coast edge and where the coast edge consists of raised beach

deposits, undercutting by the sea appears to be occurring at high water along several sections. Constantines Cave (NO61SW6), Randerston Castle Cave (NO61SW7), and Kinkell Cave (NO511NW42) have been identified in these raised beach deposits, each bearing inscribed evidence for human settlement since at least Roman times. However, erosion does not appear to be active near any of these cave systems. The existence of coastal defence walls at points along the coast confirms that erosion has been active along this coastal sector in the past. Protective measures vary from 19th Century stone walls (e.g. NO58191434-58091430), to more modern techniques such as gabion baskets. Several pillboxes on the coast edge near Fife Ness at Balcomie Links which were recorded fairly recently appear to have been demolished. That one of these (e.g. NO61SW17) had been recently scheduled as a Protected Ancient Monument is a particular cause for concern.

From St Andrews to Tentsmuir Point- St. Andrews is flanked by two beaches, East and West Sands. East Sands is contained between cliffs of the raised shorelines to the south and the harbour walls of St. Andrews harbour (NO51NW63) to the north. Formed at the mouth of the Kinness Burn, the inner harbour is protected by sea walls and a dune ridge behind East Sands. However, some of the harbour walls have deteriorated due to a lack of maintenance in the past (Moore 1992) and faulty land drainage causing scour erosion behind the harbour walls. Many of the important monuments which make the medieval town of St. Andrews such an integral part of Fife's built and archaeological heritage lie behind the coast edge and are therefore not susceptible to coast erosion. However, several notable Protected Ancient Monuments and Listed Buildings are located on the coast edge. St. Andrews Castle (NO51NW3.0) is protected by a concrete sea-wall which appears to have halted erosion. A rock platform with fringing beaches at Castle Sands, Witches Lake and Step Rock separates East and West Sands where localised cliff-top erosion has occurred in the recent past exposing drainage outflows and old walls. West Sands is a wide sand beach with a low gradient and surplus blown sands nourish the active dune zone which can be seen along the coast edge. In the hinterland there is an extensive raised beach and links area with blown sand deposits. Relic dunes can be seen within the grounds of the golf courses and this illustrates that West Sands has accreted seawards over time. Monuments identified along the sands include wooden remains of a wreck, maybe the *Jean* or the *Wilhelmina* (NO50461734), and a line of tank traps (NO50071821 - NO499018700) which follows the dune system. Outhead, the northern point of West Sands, is a dynamic sand formation which is migrating north-eastwards towards the Eden estuary. This migration is associated with the longshore drift of sand along West Sands and the changing position of the Eden. Since the early 1960s the natural balance between accretion and erosion has been upset by the interference of man. A tip was initiated at the northern margin of Outhead to gain land. Ongoing erosion of this tipped waste means that the sea is now re-establishing a state of equilibrium. West of Outhead the blown sands at the golf course edge have been eroded and coastal defence measures such as groynes and gabion baskets have been deployed in the past to combat this problem.

The Eden estuary, the inner estuary foreshore is composed of thick alluvial muds stabilised by marsh. Although the mud will provide a favourable burial environment for archaeological remains, few monuments were identified on the foreshore or coast edge. Sites which were identified relate either to the industrial past of Guardbridge and Leuchars, such as the paper mill and former distillery buildings at Guardbridge (NO45051950), and on the foreshore, a mussel tank (NO46951940) originating from the harvesting of shellfish which took place in the 19th Century, as is evident from the O.S. 1st Edition map series (1854). The outer estuary experiences the redistribution of silts and sands by coastal processes and dramatic changes in the position of the main channel have been recorded throughout history. Before the late 19th Century, the coastline south of Reres Wood experienced noticeable accretion, however a rapid migration of the Eden between 1895 to 1919 resulted in erosion of this accreted land. This erosion is balanced by accretion of sand at Sanctuary spit, which is migrating southwards into the estuary. Sites identified on the north shore of the Eden estuary are mostly connected with the existing RAF airbase at Leuchars and therefore date no later than the early years of the 20th Century. The coast edge adjacent to the base is heavily protected by coastal defences.

Tentsmuir beach, Tentsmuir has one of the largest dune systems in Scotland. The extensive dune area is the result of considerable Postglacial sea-level fall which left a wide beach zone upon which dunes developed. Blown sand and dunes encroached westwards over low raised beach sands. Accretion of sands towards the southern end of the beach has resulted in a net seaward movement of the high water mark. Within the forested area relic dune ridges run parallel to the coastline. The position of the Second World War observation posts, command posts, pillboxes, and antitank blocks, set back as they now are in the forest, suggests that the coast edge has altered substantially. These monuments dominate the archaeological record along the Tentsmuir coastline and reflect the threats posed by military invasion of this low-lying area from the sea. Many of the monuments have been recently recorded by John Guy in his survey of wartime archaeology (Guy 1992-4), however, some other features were noted. Although there is no known evidence within the survey area of much earlier settlement on the Tentsmuir peninsula, the identification of Mesolithic remains at Morton Farm nearby does illustrate that the Fife coastal landscape was settled at an early date (Wickham Jones 1994, 67-68). In contrast to the accretion experienced along the southern sector of Tentsmuir beach, the northern part has undergone a net landward movement of the high water mark. There has been severe erosion in the last year and at certain sections this has caused erosion to tank-traps (intermittent between NO50412617 and NO50432700) and uncovered foreshore features (NO507267). A complex interplay of waves and tidal currents occurring at the mouth of the Tay Estuary has developed the spit/bar of Abertay Sands, sheltering Tentsmuir Point and altering the position of the main estuary channel, and has dictated the cycles of accretion and erosion along Tentsmuir Sands. In addition to several coast edge sites relating to the Second World War, the wide expanse of sandy foreshore visible around Tentsmuir Point at low water preserves extensive evidence of glider traps used to deter an airborne invasion (NO502282).

The Tay Estuary, the coastline of the outer Tay is generally experiencing erosion. Blown sand deposits at the coast edge are being undercut by the sea and where there are no manmade defences the forest reaches the coast edge. However, the coast edge is more stable to the west of Tayport where cliffs composed of resistant basaltic and andesitic Devonian rocks reach down to the coast edge and curved beaches develop between the igneous rock promontories. Generally speaking, shingle and cobble deposits compose the upper foreshore of these curved beaches often with the development of shingle ridges at the coast edge. The wide sandy foreshore to the east of Tayport harbour has the greatest concentration of archaeological remains seen along the entire survey area, with evidence of glider traps, and possible older fish traps visible, as well as a collapsing breakwater (NO461288-NO461291: site description 4), the wreck of a small boat (NO46152902: site description 4), and the Listed Building know as 'the Pile' Lighthouse (NO46302930: site description 4). These last three monuments are all part of an extensive complex of maritime remains in the vicinity of Tayport Harbour (NO42NW58 and NO42NW75 : site description 4) which are of significant regional importance. The stone walls of Tayport Harbour are in a poor state as a result of a lack of maintenance in the past, and in particular because of poor land drainage causing scour erosion behind the walls. A similar picture is evident at Newburgh Harbour (NO23741877 to 23321858 : site description 6).

As the estuary progresses westwards, the foreshore narrows where deep tidal channels flow close to the coast edge and becomes increasingly silty until, west of Balmerino, marsh stabilises the thick alluvial muds which have accumulated on the upper foreshore. The mud flats on the lower foreshore are particularly favourable for the preservation of archaeological remains as is evident from the discovery of a Postglacial peat flat of partially decomposed plant fragments, tree remains, and other environmental evidence on the foreshore between Birkhill Lodge and Flisk Point (NO326231). Localised undercutting of this land surface was visible by the flow of the estuary along the coast edge and the reason for the uncovering of this feature, possibly in recent times, could usefully be investigated further along with a more detailed survey of the feature itself. The industrial remains of the Tay Salmon Fisheries dominate the coastal landscape between Wormit and Newburgh. Collapsed bothies (e.g. NO33082340: site description 6), fishing platforms (e.g. NO32302297: site description 6), decaying harbours (NO35602482: site description 6), salmon cobbles (NO35662481: site description 6), and other associated remains are all visible along the coast edge. Most of the features are not at risk due to coastal erosion as such, but many are decaying nonetheless due to neglect, and in some cases, vandalism. Although these monuments relate to an industry that has only recently fallen into decline, these important features remain unrecorded in the archaeological record and more attention is required.

The survey identified 317 sites within the target area. Of the total, 203 are not listed by the NMRS and the

majority of these were identified on the coast edge and foreshore. A further 114 sites have already been recorded on the NMRS

Maritime Fife recommends that no action is needed on 259 sites but suggests that further survey work be undertaken on 44 sites, with monitoring required on 10 sites and a combined programme of survey and monitoring studies on 4 sites.

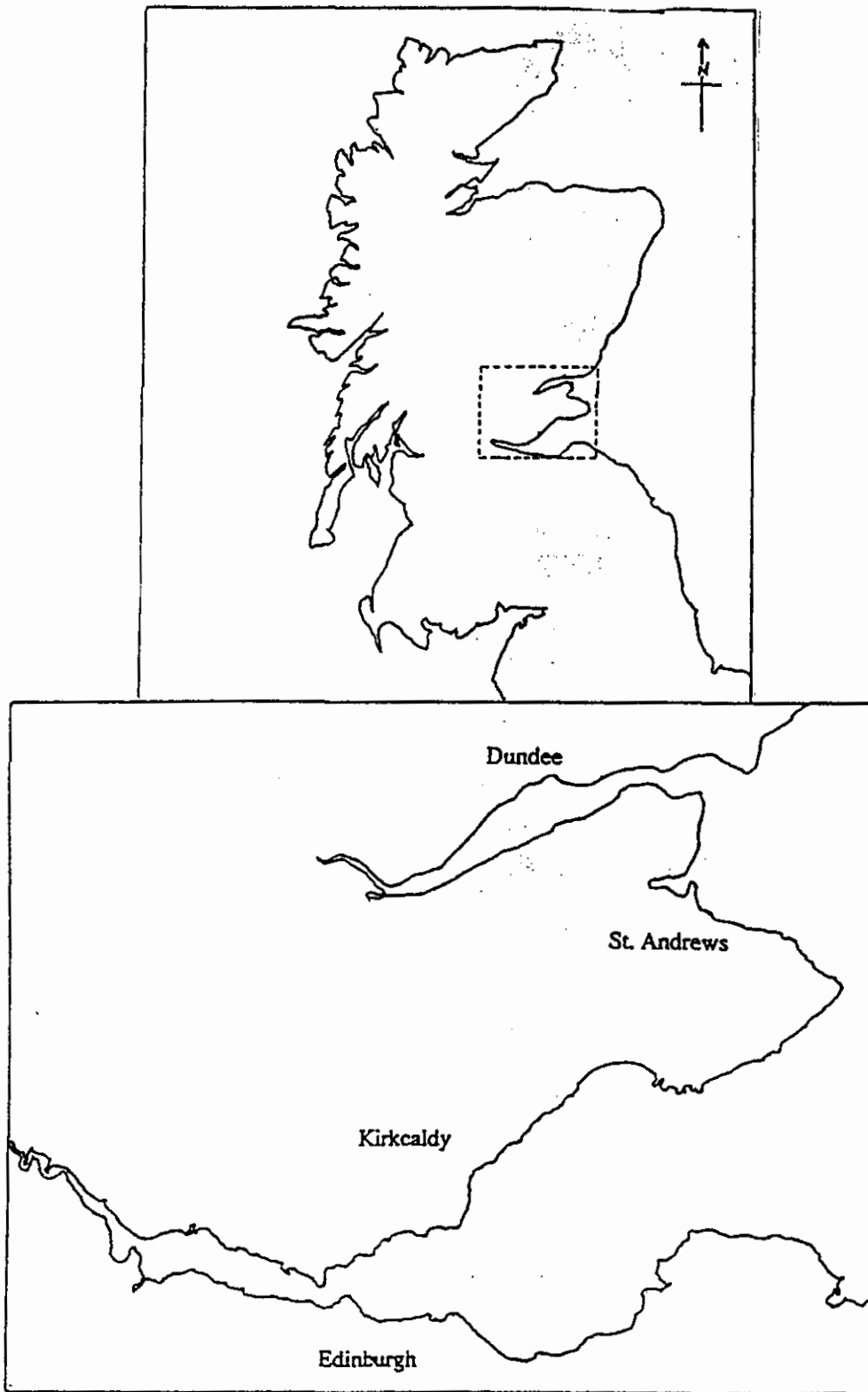


Fig 1: Location map of survey area -
Fife - FifeNess to Newburgh

