Site Description 1:NO636098 **Site Name: Fife Ness Harbour and Lighthouse Construction Site**
NMRS code: Harbour (NO60NW33.0); Lighthouse Construction Site (NO60NW33.1)
Site Status: Other known monument

Description:

Fifeness harbour (NO60NW33.0) consists of an enhanced natural rockcut inlet with rough coursed stone quay facing north-south. The quay consists of local sandstone rock and blast holes are visible in the worked stone. The existence of a harbour at Fife Ness was first mentioned in 1537 and at this time, probably consisted simply of the natural rock inlet. However, the quay dates probably to the early 19th Century and was used for shipping stone from Craighead quarry. The corroded remains of a tramway rail line can be seen to the west of the quay, marked by holes in the sandstone bedrock, some of which still contain some metal fittings.

Lighthouse Construction Site (NO60NW33.1) Nearby, a twin circular groove of indentations 0.3m wide by 0.15m deep can be seen with an overall diameter of 7.0m cut in the flat natural rock. A pivot-hole, 0.7m in diameter, is cut in the centre of the stone. There are other indefinite traces of cuttings in the rocks nearby. This feature marks the base for construction work carried out in the early 19th Century on Robert Stevenson's lighthouse for the North Carr Rocks.

Threat:

Fifeness harbour (NO60NW33.0)

The early 19th Century sandstone quay which can be seen at Fife Ness Harbour is almost completely collapsed, with the height of the quay now some way below the level of Mean High Water and with an extensive debris field of scattered boulders from the quay. Collapse has been caused by wave damage caused by easterly gales and high tides, and through lack of maintenance since the harbour fell into disuse. The existence of the tramway fittings nearby is also of interest, but the iron fittings will not last much longer due to corrosion in sea water, and the holes for these fittings are being gradually eroded by shingle scour.

Lighthouse Construction Site (NO60NW33.1) The indentations marking the base of the lighthouse construction site are heavily eroded at the edges and in some places are not invisible. This has been caused by shingle scouring and other marine action.

Recommendation:

Given the state of collapse of the stone quay, and the ongoing erosion to the tramway fittings and lighthouse construction site, it is recommended that the existing monuments be compared with the baseline surveys carried out by RCAHMS in 1990 to establish whether any changes have occurred in the recent past and toassess what can be done to mitigate any decline.

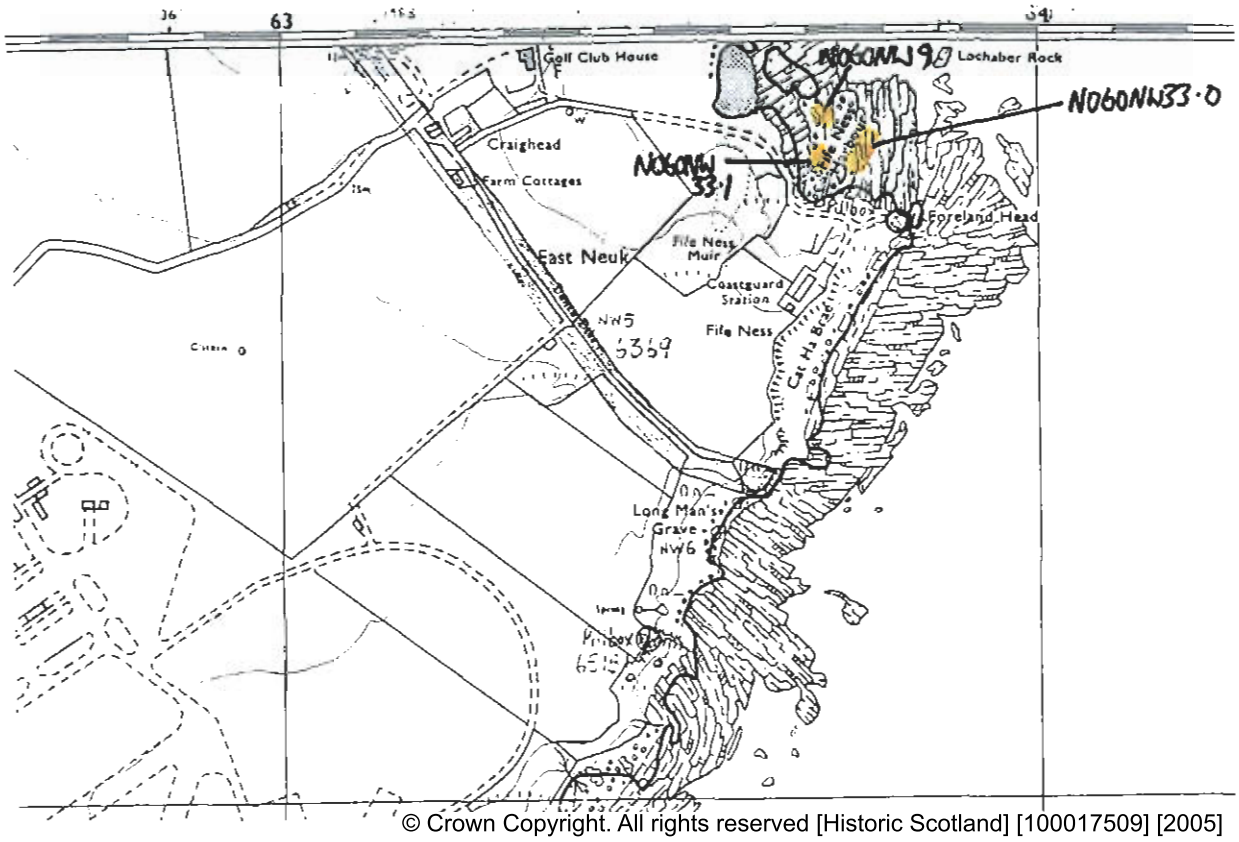

Fig 3: Fife Ness harbour and Lighthouse Construction site.
(NO60NW33.0;NO60NW33.1)
Sheet NO60NW Scale: 1:10,000

Fig 4: Fife Ness Lighthouse Construction Site (NO60NW33.1)
Photograph - Rudiger Bahr

Site Description 2: NO60131258 **Site Name: Kingsbarns harbour and Limekilns**
NMRS code: NO61SW11
Site Status: Other known monument

Description:

Kingsbarns harbour consists of vertically coursed sandstone seawalls to north and south, fine stone bollard fittings, and metal mooring fittings. The harbour was constructed in 1810 and was used as a harbour to ship grain and potatoes to Newcastle and London, and to import drainage tiles. The original harbour consisted simply of the north wall which was extended in 1861-3 when a second seawall was added on the south side of the harbour. At its heyday, the harbour had capacity for ships of up to 100 tons. Unfortunately, its exposed location meant that the harbour walls suffered from erosion and the harbour was eventually abandoned only 20 years after repair work. Nearby, are the remains of an early 19th Century limekiln, used for agricultural purposes.

Threat:

The principal threat to Kingsbarns harbour is from erosion. Throughout history, the harbour has suffered from sea damage which brought about its downfall at the end of the 19th Century. Since then, only a small part of the northern sea-wall remains intact, while the foundation courses are also intact along the length of the southern sea-wall where it appears to be protected by accreting sand deposits, and at the foundation layers of the outer wall. Sand can be seen to be breaching the northern quay at the landward side where the quay line is no longer visible. The survey team testified to substantial deterioration since a measured survey was carried out by the Scottish Institute of Maritime Studies in the 1990's. This indicates that the rate of erosion may be rapid.

The nearby limekilns appear to be fairly stable and lie behind the coast edge. The only evidence of erosion was from footpath damage caused by access to the beach from the car-park behind.

Recommendations:

A further survey of this site would be desirable to confirm whether the harbour has deteriorated since the 1990's survey carried out by S.I.M.S. If there has been deterioration, then the site should be frequently monitored with additional recording work carried out in the event of imminent collapse of the harbour and its associated features, and, if required an assessment made of what can be done to mitigate the effects of erosion. In addition, monitoring of sand movement along the coastline as well as dune stabilisation work to trap sand in the vicinity of the monuments might help to protect the harbour wall structure and limekilns in the longer term.

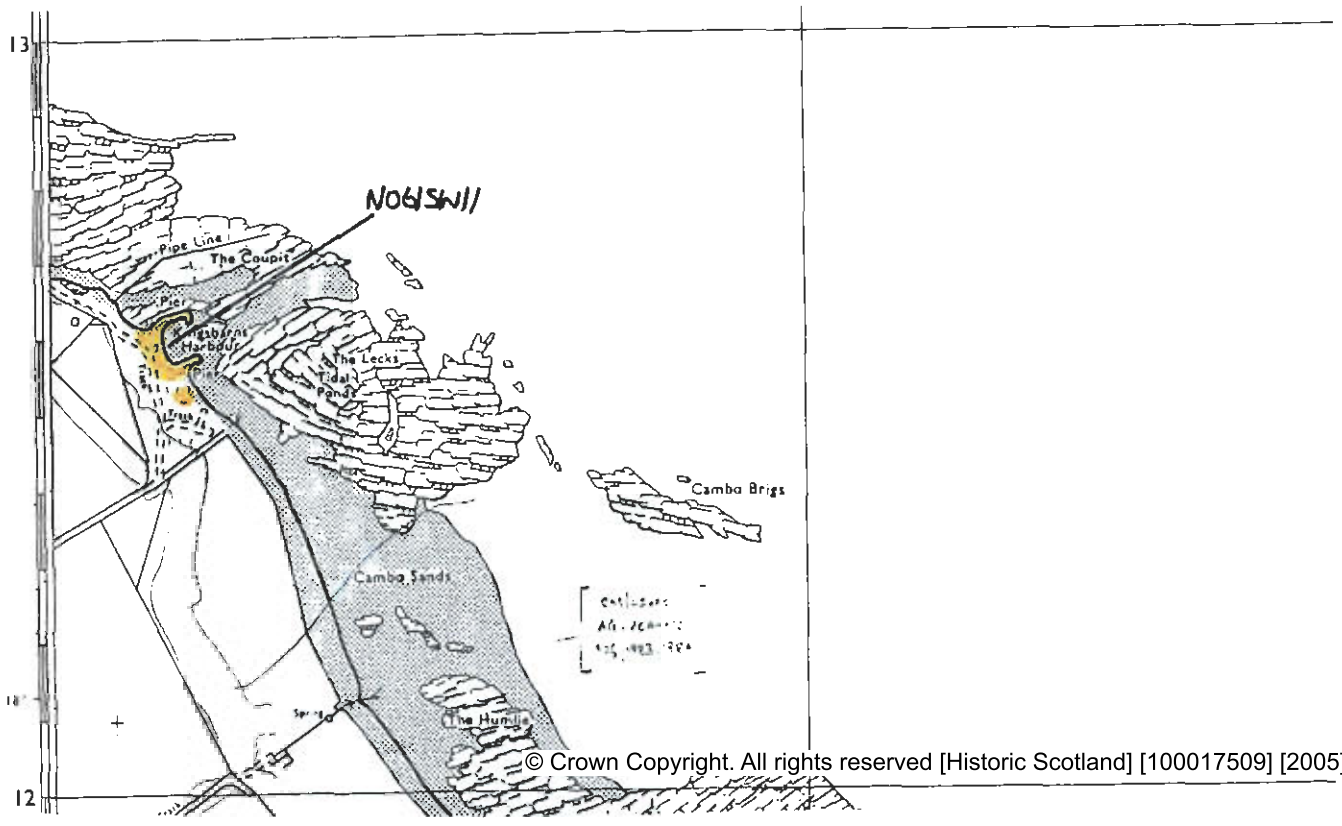

Fig 5: Kingsbarns Harbour and Limekiln (NO61SW11)
Sheet NO61SW Scale 1:10,000

Fig 6: Kingsbarns harbour wall looking east
Photograph - Rudiger Bahr

Site Description 3: NO512169 **Site Name: St. Andrews Castle Piers**
NMRS code:NO51NW118
Site Status: Other known monument

Description: The NMRS (NO51NW118) identified a possible pier for St Andrews Castle consisting of a ridge of tidal rocks flattened at its top indicating that this once formed the foundation of a pier or jetty serving the castle as a landing. This feature was not clearly identifiable to the survey team but it was clear that a sequence of 3-5 inlets cut into the rock platform do lie between St Andrews Castle and the existing harbour complex. Although these are natural features, consisting of ridges and hollows running in a west east direction, they have clearly been enhanced by the placing of iron mooring posts, stepways and cart tracks cut into the littoral rocks. Photographs in the St. Andrews University library show ships beached in these inlets so we may presume that the area was used in the 19th Century as an additional holding ground for boats in good weather. The proximity to St. Andrews Castle does make it likely that these features would have been used much earlier than the 19th Century and probably since medieval times. However, the visible features are almost certainly of 19th Century date.

Threat: *These features have been inadequately recorded to date.* Although the geology of the foreshore at this point will insure that the natural rock inlets remain stable for the foreseeable future, the enhanced features will soon disappear. Only a few iron fittings remain due to the corrosion of iron in sea-water and the other post footings, visible as cuts and drill holes into the littoral rocks are gradually eroding as a result of shingle scour.

Recommendations: A thorough survey of these features is required, including an E.D.M measured survey of the entire area including St. Andrews Castle, all identifiable inlets, post footings, steps, cart ways, and other features as far as the west sea wall of St. Andrews harbour.

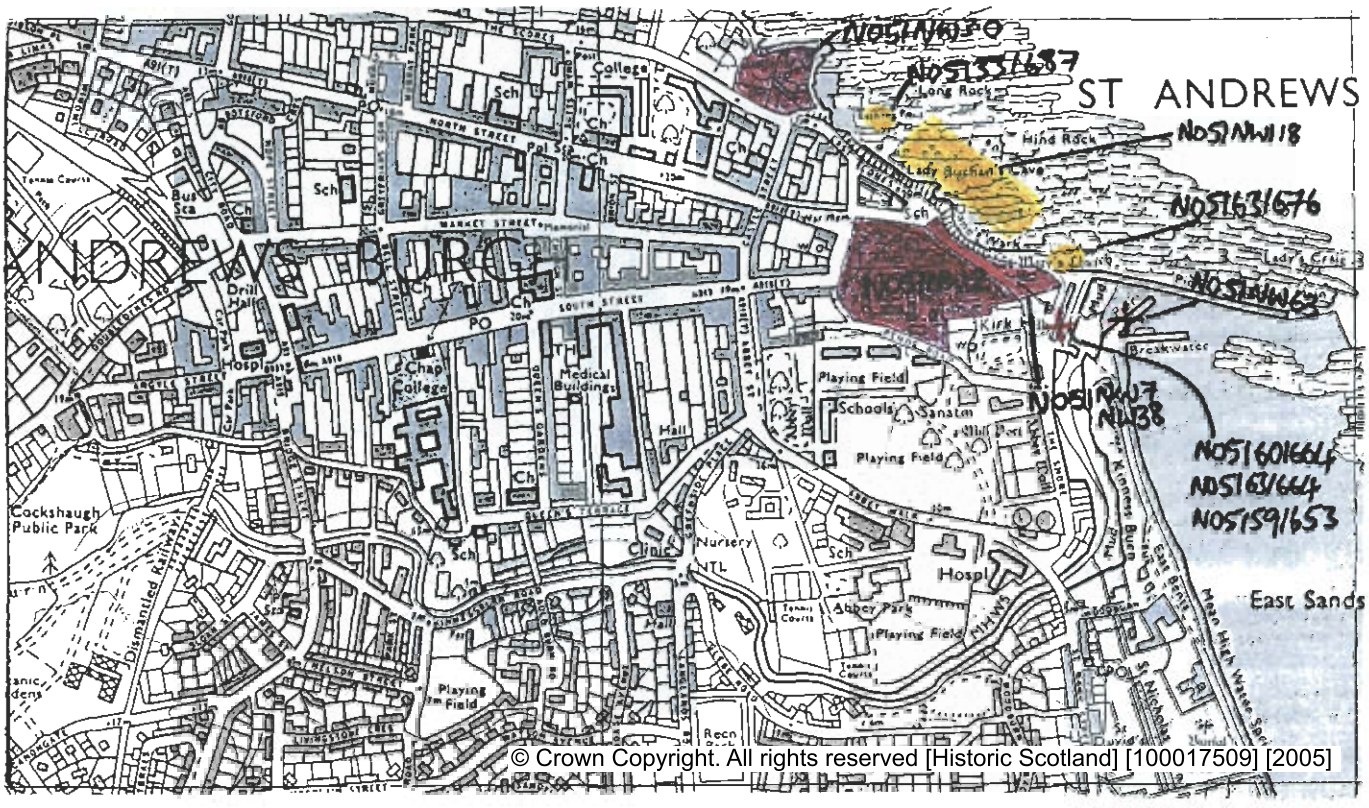

Fig. 7: St Andrews Castle piers (NO51NW118)
Sheet NO51NW ; Scale 1:10,000

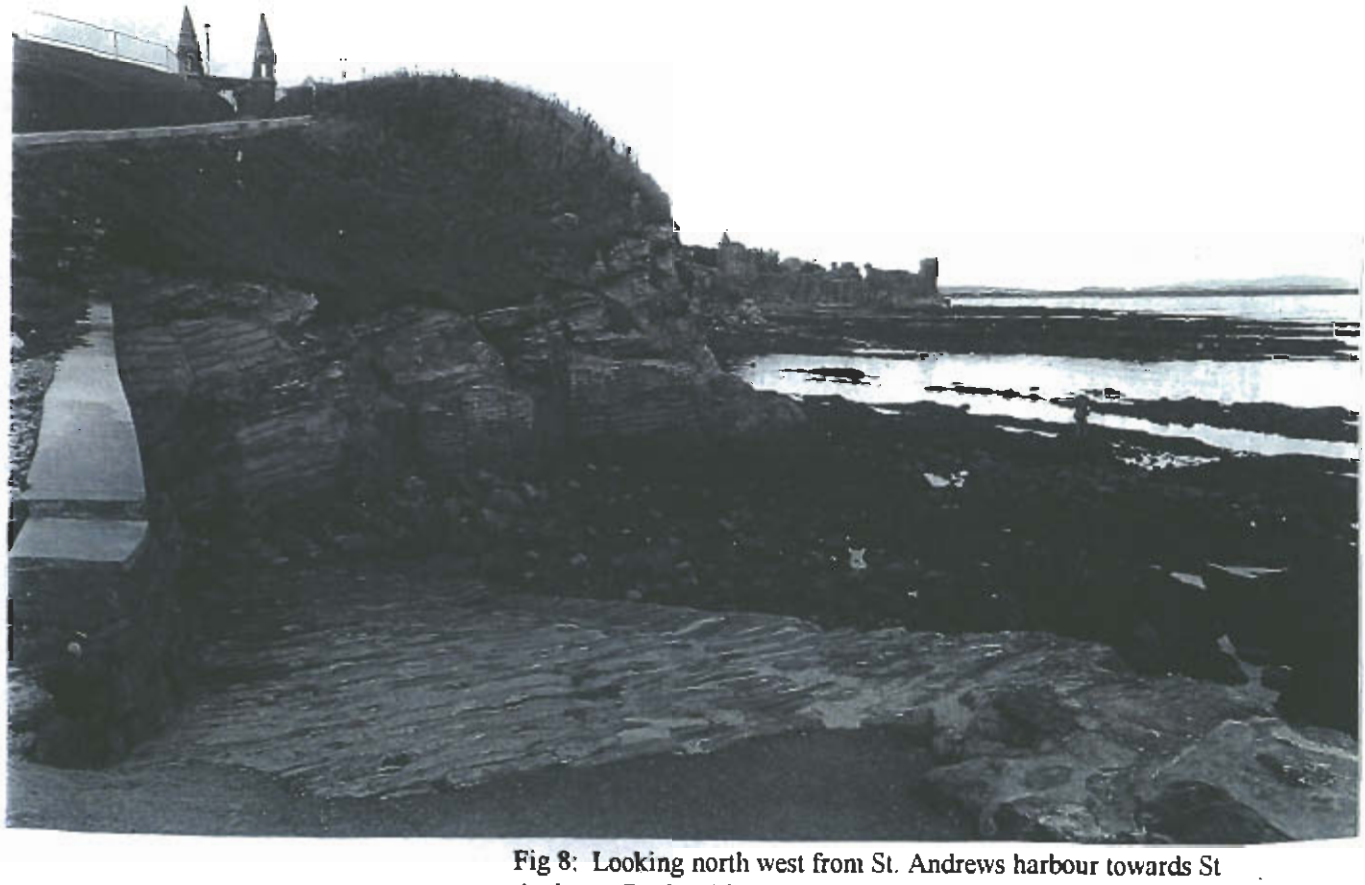

Fig 8: Looking north west from St. Andrews harbour towards St Andrews Castle with enhanced piers in the foreground.
Photograph - Rudiger Bahr

Site Description 4: **Site Name:Tayport Harbour (area): various**
NMRS code or NGR: Tayport Harbour (NO42NW58); The Pile lighthouse (NO46302930); old harbour breakwater (NO461288-461291); wreck of small boat (NO46152902).
Site Status: Other known monument

Description:

- **Tayport Harbour (NO42NW58)** - Twin harbour system. Main harbour comprises outer stone harbour wall encloses harbour basin with quays on three sides, and two slipways on west and south west corners of the basin. Smaller harbour to northwest comprises cross quay and main quay, footings of a building, foundations for a crane, fine two storey restored building with door opening on to small quay. This may be the harbourmasters house. A third quay and slipway can be seen at the northern end of this complex.
- **Old Harbour breakwater (NO461288-461291)**- Visible as a curving mound of collapsing stones on otherwise mud/sand beach. Breakwater extends from coast edge in a northerly direction and is approximately 250-300 metres in length. Quay has almost entirely collapsed except for a section at the northern end of the breakwater where rough stone walling remains intact at a maximum elevation of 1.5 metres above the level of the beach. Possibly Formed from offloading ballast from ships and used to gain access to gravel islands at low water for the purposes of salmon fishing *(Pers. Comm. J. Macmanus)*
- **The Pile lighthouse (NO46302930)** - square timber frame construction lighthouse mounted on wooden stilts; light mounted on top of square box shelter. Light approached originally by ladder from a rowing boat tied up at the base of the stilts. Now disused. Used to mark the entrance channel for Tayport harbour and to warn shipping away from treacherous sand banks to the South of the light.
- **Wreck of small boat (NO46152902)**- The remains of a small wooden carvel planked boat lie adjacent to the old harbour breakwater. The wreck is 8.70 metres in length and is lying on her starboard side with the stern pointing south and bow pointing towards the breakwater. Stone ballast, iron fittings, and remains of a marine diesel engine were visible and this suggests that the wreck dates to the 20th Century.

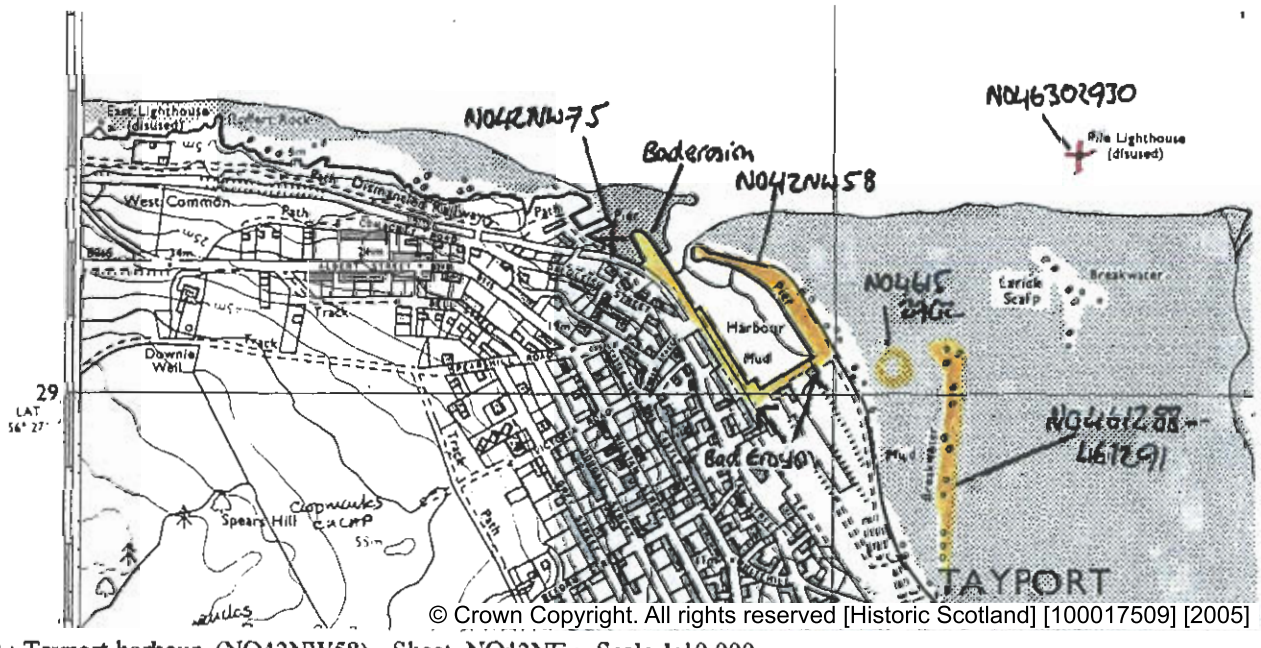

Fig. 9 : Tayport harbour (NO42NW58) - Sheet NO42NE ; Scale 1:10,000

Threat: There is evidence of serious erosion to the harbour walls at Tayport Harbour (NO42NW58). The sloping cobble wall at the southern end of the main basin is collapsing probably because of faulty drainage causing water run-off to undermine the ground behind the wall. There has been a recent housing development in the land adjacent to this section but it was unclear whether pavement works could be connected to the deterioration of the wall. Further damage of a similar nature was evident on the topstones of the main quay of the northern harbour complex. Again drainage is probably the cause of this collapse. However, erosion to the northernmost harbour feature has probably been caused by marine action. Land-fill has been dumped at this point in an effort to mitigate the effects of erosion. Since the Pile lighthouse (NO46302930) fell into disuse, its condition has deteriorated but its structure appears to be fairly sound. However, given its exposed location, this attractive feature will quickly deteriorate. The old harbour breakwater (NO461288-461291)has almost entirely collapsed and the wide scatter of debris building material indicate the erosive effects of the sea on this feature. Although the small wreck (NO46152902) is buried in mud, it will deteriorate fairly quickly once its iron fittings have corroded and rusted away.

Recommendations:

Tayport Harbour (NO42NW58)
-Survey and monitor

Old Harbour breakwater
(NO461288-461291) *-Survey*

The Pile lighthouse (NO46302930)
-Survey and monitor

Wreck of small boat (NO46152902)
- Survey

Fig 10: Scour erosion to Tayport Harbour wall; Photograph - Rudiger Bahr

Site Description 5: **Site Name: Wharf remains and wreck.**
NMRS code: Wharf remains (NO397263); Wreck (NO32NE8147)
Site Status: Other known monument

Description:

- **Wharf and building remains (NO397263)**

A substantial area of wharfs, hulks, and building foundations was located just to the east of the Tay Railway Bridge at NO397623. This site is located on a rock and shingle foreshore backed by high cliffs. It consists of a line off square stones running parallel to the cliffline and probably marking an old stone quay. At the western end of this quay, three parallel lines of substantial timber piles mark the remains of a second quay or landing stage. Substantial brick foundations and collapsed walls are visible towards the back of the foreshore at the western end of the site, adjacent to a timber frame wharf which has been built onto a natural rock spur and the working lifeboat slip and shed. Aerial photographs (1946 1:10,000) show the quays and associated buildings fairly clearly although most of the site area is obscured by shadow. The site was initially thought to be that of Woodhaven Seaplane base (NO42NW85) but Guy has identified an alternative site 1 mile SW of Newport Harbour at the existing Woodhaven harbour site (NO40752700) where he points out a slipway which was used for launching sea-planes (Guy, 1992-4, 127). The base was used during World War II for anti-submarine patrols.

- **Wreck (NO32NE8147)**

The NMRS lists a wreck visible on the aerial photographs which is situated just to the east of the main wharf area. at NO39822645 (NO32NE8147). The remains of this substantial vessel are 25 metres in length, and the ship appears to be listing to starboard and facing inshore. Her ribs and outer planking are exposed. The planks appear to be fastened to the ribs mostly by treenails though iron bolts were visible at the bow timbers. Fragments of red roofing tiles found between the frames of the ship may indicate the nature of the vessel's function and trade. The existence of this wreck nearby to the wharfing area may suggest that the site was not only used as a seaplane base but for offloading cargos for transport inland.

Threat: Heavy growth of seaweed over the wreck and wharf remains suggest that the site is stable and will if anything, be protected by the accretion of mud evident along this part of the Tay estuary. However, this interesting collection of industrial remains has been inadequately recorded to date and deserves further attention.

Recommendations:

Unknown wharf and harbour remains (NO397263): *Survey*
Wreck (NO32NE8147): *Survey.*

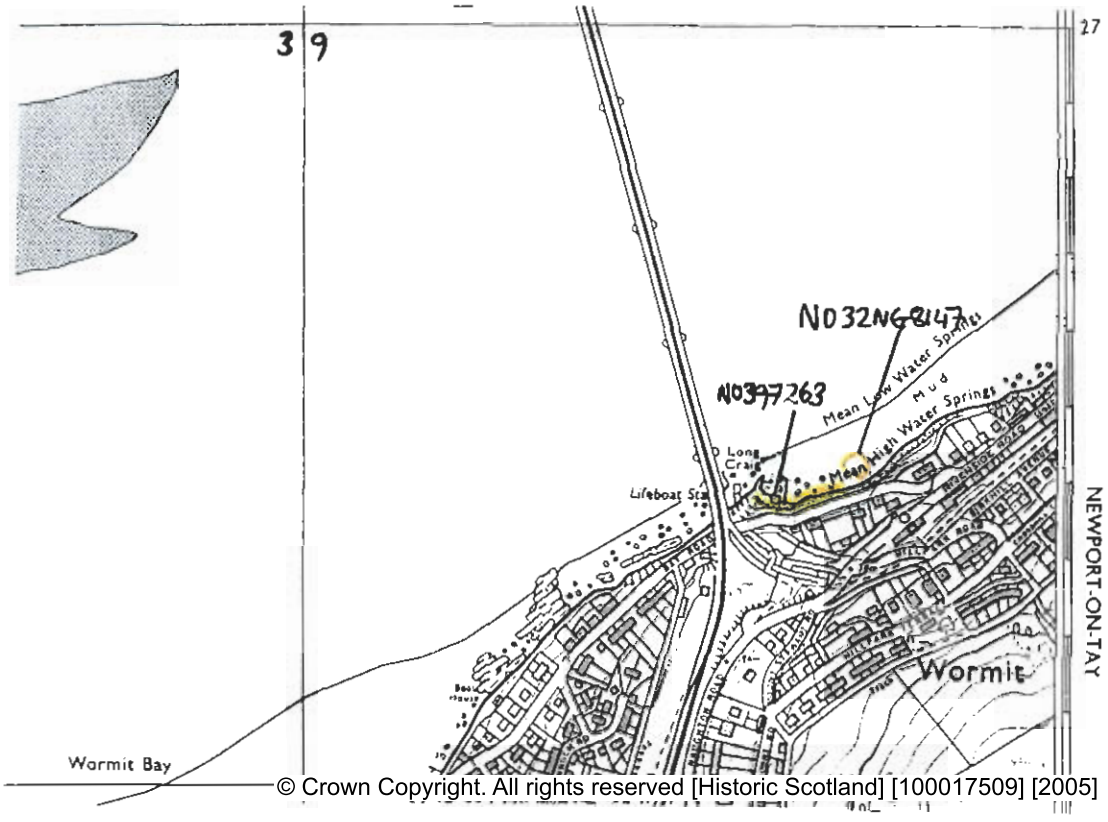

Fig. 11: Wharf remains and wreck
(NO397263;NO32NE8147).
Sheet NO32NE; Scale: 1:10,000

Fig. 12: Wharf remains in foreground; more wharfing and wreck hidden by shadow. Photograph - Rudiger Bahr

Site Description 6: **Site Name:Newburgh harbour,Tay Salmon fishery bothies and salmon coble boatyard complex**

NMRS code: Various :Site Status: Other known monument and Listed Buildings.

escription, and (condition):

NO39272602: Wooden shed, salmon coble on metal wheeled trailer, single storey, corrugated roof bothy. (Fair)

NO38542584: twin storey stone building, gable end faces river. 150 metres west of wooden jetty piles (Poor)

NO35842515: twin single storey semi-detached bothies, red roof tiles, collapsing. (Poor)

NO35972533: Nether Kirkton, converted stone building and slipway may have had fishing function (Good)

NO35782479: The Neuk - Bridgend ; Listed Building; single storey bothies recently restored (Good)

NO35772479: Tay Cottages; Listed Building; single storey, recently restored (Good)

NO356602482: Balmerino harbour quay, and iron coble-like working boat on beachat NO35662481 (Poor)

NO33082340: Birkhill lodge, stone 2 storey bothy fronts onto shingle beach protected by manmade spit with rudimentary breakwater. Collapsed iron cart and trackway to shore are visible. (Poor)

NO32302297: Walls of twin cell stone bothy. Roof collapsed, concrete platform in front. (Poor)

NO31262271: Flisk Lodge: twin single storey semi-detached bothies. NE cottage has collapsing roof. SW cottage is completely derelict. Modern navigation marker placed in front (Poor)

NO30052200: Lower Taes Lodge: single storey slate roof, overgrown by trees almost inaccessible due to thick reed growth on foreshore. (Poor)

NO29402177: Collapsing building near Durward's Scalp is probably a fishing lodge (Poor)

NO29322166: Scalp Lodge, single storey bothy, slate roof, windows covered up, situated in farmers field (Fair)

NO28082090: Building near 'Camcase', Single storey cottage, large doorway faces Tay. Two wings are rear face SW. and NE. Situated in farmer's field (Fair)

NO28572124: Deil Ma Care Lodge : single storey stone cottage with later brick shed butted onto NE gable. Felt tile roof. Stone wall in front of building at river edge. Heavily overgrown (Poor)

NO27862091: Lowershot Lodge: earlier stone cottage fronts later brick and harled extension to rear. Stone cottage has collapsing tile roof (poor); rear building has felt tile roof (poor but intact).

NO27522083: Doocot Lodge: single storey cottage and later lean to shed at SW gable. Felt tile roof. Very overgrown (Poor)

NO25721960: Jockshole Lodge: single storey stone cottages in two cells, Roof collapsed but iron ties strenthen gable ends. Fluorescent navigation marker and light nearby. (Poor)

NO25261936: California Lodge: Single storey cottage with twin cells , slate roof with later brick shed to SW gable end. Partition wall between cells removed. Steel ties to strengthen walls (Fair)

NO237418[illegible] - 23321858 : Newburgh harbour, Wharfs, quays, slipways, bollards, wreck of fishing boat (NO23501863), salmon coble on quay. Harbour walls collapsing due to drainage problems and lack of maintenance (Poor).

NO23161863- Salmon coble boatyard complex, sheds, slipway and net winches (Fair).

Research:

Salmon fishing on the Tay has probably taken place since at least Roman times and certainly since the 12th-13th Centuries but an industry has been in existence for almost 250 years (Atkinson, 1996, 4-5).

Newburgh's strategic position conveniently positioned between Perth and Dundee, meant that it became an important centre for the Tay salmon industry and stage for the transfer of goods onto shallow draft vessels on the journey to Perth. Piers and buildings were built in the 18th Century to promote the town as a staging post for the transfer of goods to shallower or deeper drafted vessels depending on whether the cargo was destined up, or down stream (Atkinson, 1996, 7-8). Below Newburgh, salmon fishing was practised on the southern shore of the estuary where the fish favoured the deeper channel during their migration upstream. Fishing techniques included toot and haul nets, stake nets, and more latterly sweep netting using a salmon coble and a shore based winch.

Little is known about the nature of the salmon bothies before the mid. 19th Century, but it is likely that the only means of shelter were 'excavations by the side of the river' (Melville, 1939, 42). Bothies probably date to the late 19th century and by 1921, O.S. maps for Newburgh show the presence of permanent lodgings. Many were modified during the 1920's with the addition of a lean to storage area extended off one of the gable ends of the building (Atkinson 1996, p.42). Other industrial monuments related to the salmon industry include ice houses (e.g. at Newburgh and Tentsmuir Forest NO500267), which were used to keep salmon fresh throughout the 19th Century (Atkinson 1996,28)..

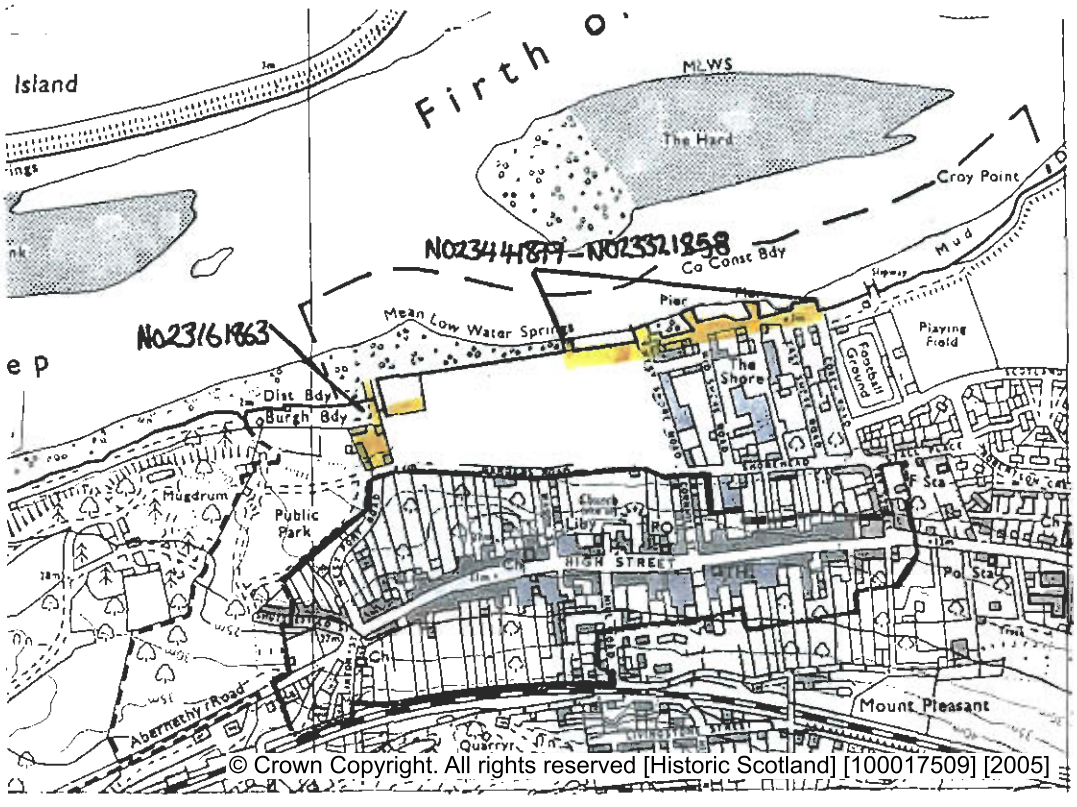

Fig. 13: Newburgh harbour (NO23741877 – 23321858)and salmon coble boatyard complex NO23161863.
Sheet NO21NW; Scale: 1: 10,000

Fig. 14: Scour erosion to the harbour wall at Newburgh
Photograph - Rudiger Bahr

Threat: The decline of the resource as a result of fish farming, mechanisation and over exploitation have spelled the death of this industry, with only 4 stations operating in 1996 employing 40 people, as opposed to its heyday when 40 stations were in operation employing approx 300 people (Atkinson 1996, p.66). The majority of the salmon bothies have collapsed, been vandalised, or now lie empty and overgrown due to the dense growth of reed beds on the banks of the Tay. These monuments remain mostly unrecorded in the NMRS and further attention is needed.

Recommendations: Maritime Fife suggest that Historic Scotland consider a thorough appraisal of all the buildings connected with the Tay salmon fishing industry, encompassing the conditions of buildings, the historical and architectural value of each and public access to the bothies. Historic Scotland should consider listing good examples of these buildings as Historic Buildings in order that the best are saved for the future.

2.0 *SUMMARY AND RECOMMENDATIONS*

The survey achieved its main objectives, a rapid assessment of the coast edge, intertidal zone and 100 metre land strip. The team located a number of new sites which will be included in the Maritime Fife database. Where sites have been recorded before, some evidence for changes in the condition of features was identified and in most cases this was due to coastal erosion, although other factors such as vandalism, and development were also thought to be contributory causes. The following pages represent a summary of the findings of the survey including observations made on the coastal heritage resource, estimates of coastal erosion and its effects on individual monuments, and general recommendations for the future management of this resource. Detailed recommendations have been submitted separately to Historic Scotland.

Built heritage and archaeology

The survey identified 317 monuments within the target area. Of these 205 sites are located on the coast edge or foreshore and therefore prone to coastal erosion. The remainder are situated behind the erosion zone.

The table below illustrates how these sites breakdown by status:

MONUMENT STATUS	**TOTAL NUMBER OF SITES**	**NUMBER AFFECTED BY EROSION**
PROTECTED ANCIENT MONUMENTS	11	2
OTHER KNOWN MONUMENTS	209	45
MONUMENTS FORMALLY PROPOSED FOR PROTECTION	1	0
LISTED BUILDINGS	91	2
WRECKS	5	0
DESIGNED LANDSCAPES	0	0
TOTAL	317	49

Fig. 15 : - Breakdown by site status of total numbers of recorded sites and the effects of erosion on each site

Previously unrecorded sites.

The survey identified 203 sites which are not listed on the National Monuments Record. Many of these appear to be Listed Buildings which have obviously been recorded before but are not registered on the NMRS.

However, the survey also identified a number of sites, mostly along the foreshore or coast edge, which previous surveys have not addressed.

Of particular regional interest are the series of salmon bothies, and other structures associated with the Tay Salmon Fisheries Industry (various: see site description 6), very few of which have been recorded by RCAHMS. The ongoing decline of this industry makes it all the more urgent to record what remains at present before remaining structures decay further. A collection of wharfs (NO397263) and a nearby wreck (NO32NE8147) that were located on the eastern side of the Tay Rail Bridge are also of interest and of these, the wharf features do not appear on the NMRS. Although the foreshore appears fairly stable at along this sector, this area deserves more detailed attention. There were few newly identified sites along the sand beaches of Tentsmuir and St Andrews. Those that were identified related either to the World War II activity associated with the Tentsmuir area, and in particular an air bombing range which existed offshore. The survey identified several other features which have not been mentioned in the detailed site descriptions and therefore deserve mention here. These include a prehistoric land surface which has been exposed on the banks of the Tay to the west of Balmerino (NO326231-NO312227: see fig. 16 below), a weathered sandstone standing stone (NO53321572) near Kinkell Cave on the rocky foreshore south east of St Andrews, and several enhanced natural harbours (e.g. NO61061141).

Fig. 16: Prehistoric land surface exposed on the muddy foreshore of the Tay estuary west of Balmerino (NO322231-NO312227) ; Photograph - Rudiger Bahr

Known sites

A further 114 sites have been recorded on the NMRS. This number includes 11 Protected Ancient Monuments, of which two have been adversely affected by erosion: two pillboxes situated on the coast edge near Balcomie Golf Course at Fife Ness (NO61SW16, NO61SW18: see fig. 17). Other recorded sites vary from burials (e.g Old Haiks NO61SW2) and harbours (e.g. St Andrews NO51NW63) to castles (e.g. Randerston NO61SW4), and from caves (e.g Constantine's NO61SW6) to shipwrecks (NO32NE8147). The character of this archaeological record broadly reflects the settlement, industrial activities and land-use of this coastline since antiquity.

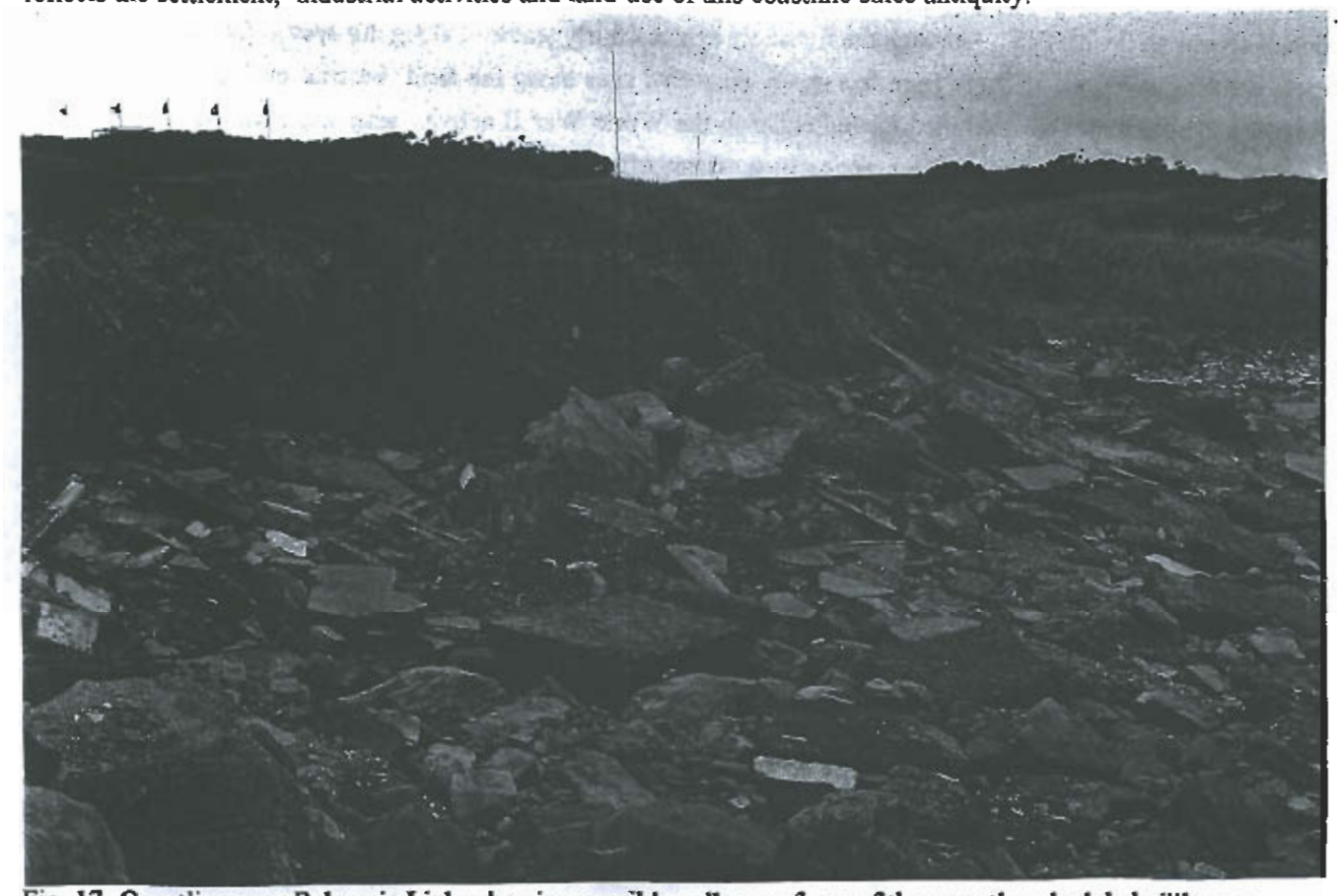

Fig. 17: Coastline near Balcomie Links showing possible collapse of one of the recently scheduled pillboxes (NO61SW18). Photograph - Rudiger Bahr.

Coastal erosion

Estimates on coastal erosion have been restricted to the subjective observations of the survey's geomorphologist and her discussions with locals en route. There is clearly a need to corroborate this evidence by baseline recording at a number of fixed locations.

By calculation of the *lengths of erosion* units, observed during the survey, it appears that approximately 9.55 km (11%)of the coastal survey area is definitely experiencing erosion and that there may be erosion occurring along approximately a further 17.5 km (20%) of the coast (see fig.19). Although erosion rates were seen to vary substantially, even between adjacent sections of coastline, it was possible to identify the following trends in coastal erosion along the survey section.

- Along the exposed coastline between Fife Ness and Kingsbarns, the sea is exploiting breaks in the rock cut platform resulting in localised undercutting of the coast edge (See fig. 18).

Fig. 18: Erosion of a loosely consolidated raised beach terrace near Buddo Rock. Photograph - Rudiger Bahr

- East Sands is generally stable despite experiencing changes of up to 1 metre in beach height. This results from the complex interplay of tides and currents which transports sediment between the beach zone and offshore sinks and bars
- West Sands experiences cycles of erosion and accretion with dune rehabilatation maintaining the stability of this beach zone. In contrast human interference at Outhead has induced erosion at the northern point.
- The southern sector of Tentsmuir sands is experiencing accretion while the northern sector is being eroded. This is the result of natural change due to the complex interplay of tidal currents and waves which occurs at the mouth of the Tay Estuary. The erosion of this northern sector of Tentsmuir has been a matter of recent concern because the watermark is retreating inland at a substantial rate. The position should be monitored, and work might have to be undertaken to stabilise dune vegetation in this area.
- The Tay Estuary is generally experiencing accretion of sediments resulting from agricultural run-off from farming and land-use upstream. However localised erosion is occurring where estuarine currents at high waters flow close to the coast edge, and in built up areas, erosion is caused by drainage run-off from the land.

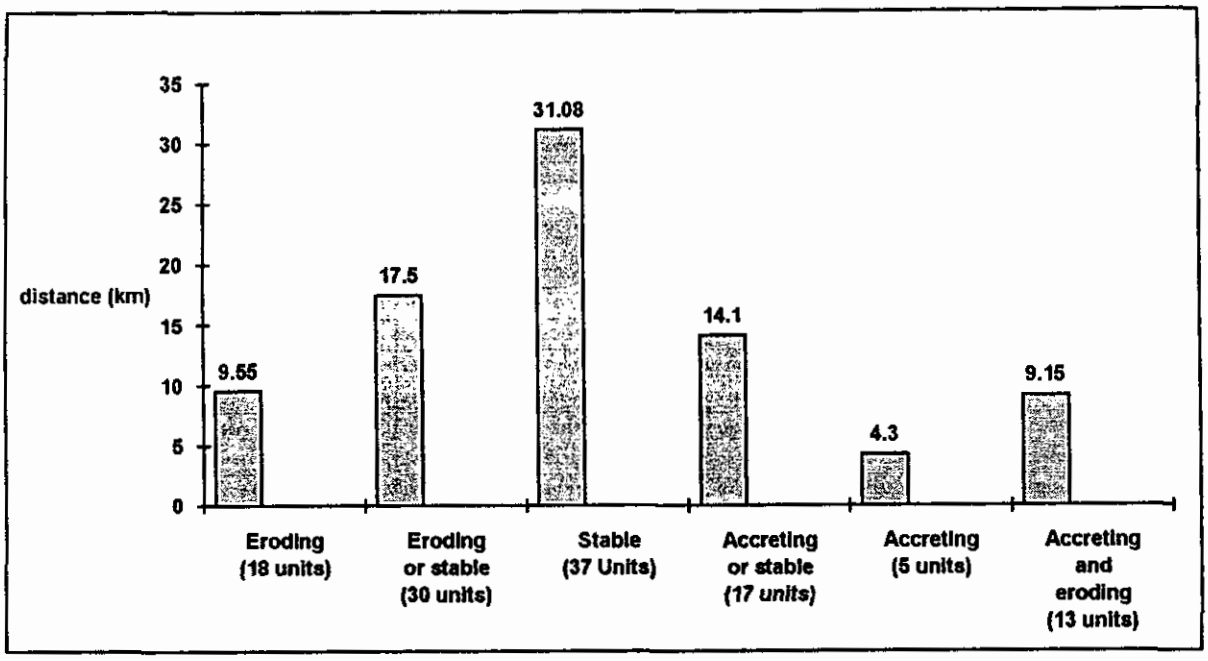

Fig. 19: Erosion units (%) by total length (km)

Factors which were perceived to play a major part in controlling the erosion rates along the coastal edge include the deployment of coastal defence m measures, the geology of the coastal edge, and the degree of shoreline exposure. Coastal defences were seen to be effective in limiting erosion along protected stretches such as at St. Andrews Castle, but the resulting effects to unprotected sections of coastline, while difficult to quantify, need to be considered by Historic Scotland. The defences at St Andrews Castle were blended into the natural rock structure which is important for the aesthetic qualities of the archaeological site. Erosion rates varied between a coast edge comprising of resistant bedrock geology in contrast to loosely consolidated raised beach and marine deposits or blown sand. While the coastline between Fifeness is fully exposed to the open sea with the effects of erosion by the sea particularly destructive during prolonged periods of easterly gales and spring tides, the sheltered estuarine area of the Tay, displays an altogether different picture with sediment accretion along the foreshore, comprising mostly mud originating from the upper reaches of the Tay.

Erosion may be having a detrimental effect on 50 sites within the survey area (see fig. 15). Apart from the pillboxes mentioned above, none of these sites is under any imminent danger; more that the effects of erosion are more gradually detrimental to the condition and structure of the monument and its surrounding environment. The important small harbour at Kingsbarns experienced erosion to its harbour walls throughout the short history of its occupation and this erosion has now resulted in the collapse of much of the wall structure. Gradual deterioration is also evident to the harbour (NO60NW33.0)and lighthouse construction site (NO60NW33.1) at Fife Ness, and at the harbours of St. Andrews (NO51NW63), Tayport (NO42NW58), and Newburgh (NO23741877-NO23321858). However the cause of deterioration to the latter three sites is not predominantly erosion by the sea, but lack of maintenance (Moore, 1992) and drainage from the land causing scour erosion behind the wall structure. In the case of St. Andrews harbour, recent remedial work has been carried out on the inner harbour wall. However, similar work is needed urgently to the walls at Tayport and Newburgh if the decline is to be controlled and the harbour walls retained as a structure.

General recommendations

The following recommendations concern previously unrecorded sites where there is further need for investigatory fieldwork, or recorded sites where the survey team identified a need to carry out further work because the site appeared to be in poor condition or because erosion represented a threat to its fabric. Recommendations have been categorised as suggested in the Procedures ('Nil'; 'Survey'; 'Monitor'; 'Survey and Monitor'). Detailed recommendations including suggestions related to many of the sites singled out above have been submitted separately to Historic Scotland

Maritime Fife suggests that the following management programme be considered:

- Survey 44 Sites
- Monitor 10 Sites
- Survey and monitor 4 Sites
- Nil - no action required 259 Sites

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BIBLIOGRAPHY

Ashmore,P J 1994 *Archaeology and the coastal erosion zone: towards a Historic Scotland policy* Historic Scotland, Edinburgh

Ashmore, P J 1996 *A Procedure For Coastal Assessment Surveys Funded By Historic Scotland* (version 1.6). Historic Scotland, Edinburgh.

Brown, H 1994 *The Fife coast* Edinburgh

Fraser, J 1982 *Historic Fife* Perth

Graham,A 1968-69 'Archaeological notes on some harbours in eastern Scotland' *Proc Soc Antiq Scot,* 101. pp200-285

Historic Scotland, 1995 *A list of ancient monuments Scotland* Edinburgh

Hunter, J & Ralston, I (eds) 1993 *Archaeological resource management in the U.K.: an introduction* Gloucestershire.

Maritime Fife, 1996 *Coastal assessment survey for Historic Scotland : Fife - Kincardine to Fife Ness.* Historic Scotland

Melville, D 1939 *The fair land of Gowrie*, Coupar Angus

Ritchie, W 1979 *Beaches of Fife* Countryside Commission for Scotland

Silver, O 1995 *St Andrews to Largo. A longshore trail of rocks and plants* St Andrews

Smith,G & Riley, H [nd] *Coastal erosion survey: Aberdaron Bay to Great Orme* Gwynedd Archaeological Trust Report 79

Walker,B & Ritchie,G 1987 *Exploring Scotland's heritage, Fife and Tayside,* Edinburgh.

Wickham Jones 1994, Scotland's first settlers. Historic Scotland.

Unpublished

Atkinson, D 1996 *The salmon fishing industry on the River Tay since the 18th Century* M.Litt., dissertation, St. Andrews University

Dobson, N 1996 *An analysis of shipping incidents and losses of the Fife coast between the River Eden and Anstruther from 1800 to the present day* M. Litt. dissertation, St. Andrews University

Eastwood, K 1976 *Eden Estuary* Phd. thesis, St Andrews University

Guy, J,A., 1992-1994, *The World War One and Two Defences of Fife: A Survey* Unpublished report for Historic Scotland.

Maps

British Geological Survey 1982 Solid Geology 48E 1:50,000

British Geological Survey 1982 Drift Geology 48E 1:50,000

British Geological Survey 1981 Solid Geology 49 1:50,000

British Geological Survey 1980 Drift Geology 49 1:50,000

Hydrographic Office 1941 Chart 149-35 Elie to Arbroath 1:50,000

Ordnance Survey 1854 1st Edition Various

Ordnance Survey 1979 Pathfinder [un numbered] (NO 60/61) Crail 1:25,000

Ordnance Survey 1985 Pathfinder 363 (NO 41/51) St Andrews 1:25,000

Ordnance Survey 1984 Pathfinder 352 (NO 42/52) Newport-on-Tay & Leuchars

Ordnance Survey 1979 Pathfinder [un numbered] (NO 22/32) Carse of Gowrie and Balmerino 1:25,000

Ordnance Survey 1979 Pathfinder 362 (NO 21/31) Auchtermuchty & Cupar 1:25,000

Ordnance Survey 1973 NO61SW 1:10,000 Series

Ordnance Survey 1972 NO60NW 1:10,000 Series

Ordnance Survey 1982 NO42NE 1:10,000 Series

Ordnance Survey 1991 NO32NE 1:10,000 Series

Ordnance Survey 1974 NO21NW 1:10,000 Series

Ordnance Survey 1973 NO51NW 1:10,000 Series