ARCHAEOLOGICAL MONITORING OF THE INTERTIDAL AND COASTAL ZONE PEMBROKESHIRE 2004-5

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Paratowyd gan Archaeoleg Cambria
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Prepared by Cambria

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Paratowyd yr adroddiad hwn gan / This report has been prepared by Pete Crane

Swydd / Position: Senior Archaeologist

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Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith
This report has been checked and approved by

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Summary

During 2004-05 further archaeological monitoring of beaches in Pembrokeshire was undertaken, following the work begun in 2003 to establish a set of base-line data. The three locations where peat or submerged forest features were recorded in the initial monitoring were re-visited: Lydstep Haven, Frainslake Sands and Aber Mawr. Also a substantial area of peat and timber was recorded at Amroth. In the tidal river at Newport a small amount of peat was noted being eroded below the salt marsh. Other beaches were also inspected. Two previously unrecorded wrecks were noted in Gelliswick Bay in Milford Haven, probably dating to the earlier 20th century.

Introduction

This is the second intertidal project. Much of the earlier report text has been used again and includes the early beach reports where revisits have been made.

In the mid 1990s Cadw commissioned a complete Archaeological Survey of the Welsh Coast from the Welsh Archaeological Trusts (Davidson 2002). The purpose of the systematic coastal survey was to inform the future management of the coast and coincided with the development of Shoreline Management Plans for Wales. This process highlighted the lack of understanding of the on-going coastal processes, particularly coastal erosion, and its effect on the known and unknown historic environment resource.

The Pembrokeshire Coastal Survey (Murphy, 1996) identified the need for regular monitoring of the archaeological remains along the coast, both to record the on-going erosion of known sites and to identify new sites as they are revealed by erosion. The need for more detailed recording of particular sites, to improve understanding of their location and extent as well as their precise nature, date and significance, was also identified. Of particular concern was the erosion of exposures of prehistoric peat.

The main aim of this project is to record and put in place archaeological monitoring of the coastal historic environment resource, including the prehistoric coastal peat deposits. All of the major beaches from Milford Haven north to Aber Mawr were inspected and four south of the Haven: Tenby South Beach, Lydstep Haven, Frainslake Sands and Freshwater East. The beaches of Lydstep Haven and Aber Mawr had exposed peat deposits, as did Frainslake Sands, where an antler pick was recovered, but as far as can be presently ascertained, the sand cover was 100-150mm higher than normal on the majority of the other beaches.

The submerged forest on Newgale was first mentioned in the medieval period by Giraldus Cambrensis (1908, 91) and was noted by antiquarians when uncovered by a gale in 1888 (Laws and Owen 1907, 48 No 9). Whitesands Bay submerged forest was also recorded in the 1800s (Laws 1888). However, no systematic work has been undertaken on recording these peat deposits other than work for an unpublished PhD thesis (Lewis 1992), see below, and to a limited extent the (again unpublished) work by Cambria Archaeology (Murphy 1996).

Lewis undertook sampling and data gathering on six of the fifteen sites in west Wales identified with buried peat deposits. However, Lewis's site 15, Newport, being riverine rather than coastal in location, was omitted from the first project but was visited in this later undertaking. Lewis's site 2, Marros, is in Carmarthenshire, and has been left out from these surveys.

The threat to coastal buried peat deposits and intertidal archaeological sites was highlighted in February 1996 when the oil tanker *Sea Empress* grounded at the entrance to Milford Haven (James 1997). Fortunately, the contamination on the beaches was less than it might easily have been, and the subsequent clearance appears to have avoided the more sensitive beach peats.

Beaches were revisited where peat or submerged forest had been previously been recorded. At Frainslake Sands, where a substantial amount of peat was exposed in 2003, assistance was obtained from the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) to undertake a detailed survey of any revealed deposits.

Method

Following consultation with Heather and Terry James (both archaeologists with extensive knowledge of the archaeology of the southwest Wales coast) it was decided that the initial work should focus on the Pembrokeshire coast north of Milford Haven. Following this initial work South Pembrokeshire beaches were also visited. Before commencing fieldwork, information was obtained from the regional Historic Environment Record (HER) formally the Sites and Monuments Record (SMR) for those beaches containing submerged forests/peat, wrecks or other archaeological features. The Primary Record Numbers (PRN) of sites was noted and copies of the records made as necessary. Lewis's PhD thesis (1992) was also of considerable value.

The beach work was undertaken at low tide springs where appropriate. The predicted low tide height at **chart datum** is given. Note chart datum is based on lowest astronomical tide **not Ordnance Survey Datum**. If the visit was not made at the time of low water, predicted tide height from low water was calculated (Appendix 1). The air pressure was also recorded as this affects tidal heights to a limited extent. Wind direction and force can have a more considerable influence on predicted tide heights, but this was not thought to be a factor at the times of visits, when the weather was relatively calm. Where possible, a position was recorded at the low tide location by navigation grade Global Positioning System (GPS). Navigation-grade GPS map accuracy is approximately 10m, which is good for finding sites in relation to maps and relocating sites, but is notoriously bad for height (information English Heritage 2003). Because of this, GPS inherent vertical limitation heights were not recorded. The low water limit was walked and the high water limit inspected at the top of the beaches. High cliffs and caves were considered to be outside the scope of this project, as were small beaches with no archaeological records.

Known archaeological locations taken from the HER were also entered into the Global Positioning System so their position could be checked. Relevant ancient sites or finds locations are mentioned in the text and all adjacent sites or finds are in Appendix 2. A list of finds from the National Museums and Galleries Wales (NMGW) is given in Appendix 3; a number of these finds are from metal detectorists and amateur collections – their grid references are approximate and are not necessarily from the intertidal zone. New PRNs as a result of this project, mainly peat deposits, are listed in Appendix 4.

Radiocarbon dates from previous samples from some of the beaches have been calibrated using the Calib Rev 4.4.2 program to 2 sigma, 95.4% probability. A table of un-calibrated dates appears in Appendix 5.

Results

(from Amroth clockwise around the coast to Newport, Pembrokeshire).
Text in italics is reprinted from previous report

Amroth Beach (Fig. 3): Submerged forests and peat had previously been recorded (PRN 7999; 8000; and 33785). Some of these sites had produced artefacts. PRN 7999 had

produced a flint core; this site is not always visible and not seen after gale in 1995, or in this project. PRN 8000 had produced a bone artefact, considered to be Mesolithic. Neither PRN 7999 nor 8000 were visible in 1995 (notes in DAT SMR) or again in this project. PRN 33785 was an area of peat with little organic material with underlying blue clay. Some vertical upright stakes were also noted in 1996, but were insufficient to determine whether they formed part of a fish trap or other structure (Murphy and Allan 1997), again this site was not visible during this project.

The beach was visited on 13 November 2004 on a very clear and bright day, not particularly suitable for photography due to sun glare and shadow. The beach was sandy except for some rocks below the cliff edges and some exposed stones at the low tide line opposite Amroth. In front of the settlement of Amroth the beach has a concrete sea wall (Photos. 1 and 2). There was some cliff erosion to the east of Amroth, but more on the cliffs to the west, towards Wiseman's Bridge. The upper and lower tide lines were walked from Teplyn Point, to the east, westwards to Wiseman's Bridge. A metal object and fragments of submerged forest were encountered:

PRN 48136 linear metal object was discovered at the bottom of the tide line (Photo. 3). This could be an iron keel from the bottom of a small boat.

PRN 48137 was a large area of interspersed clay, peat and timber (Photos. 4 to 9). The clay was quite extensive and of some depth and appears to underlie the timbers. The timber consists of a considerable amount of fallen trees with at least one stump, possibly *in situ*. There must be some erosion through sea action, but the beach is also a popular holiday destination and is occasionally used for exercising horses, which is likely to exacerbate erosion. Further to the east razor shells are collected on the beach and erosion may also occur here.

The beach was visited on 13/11/2004. The predicted low tide height was 0.63m and a barometric pressure of 1040 reduced this by 0.28m to 0.35m.

Wiseman's Bridge (Fig. 4): Submerged forest and peat was previously recorded, PRN 7994, on the upper part of the beach below pebbles and boulders, but is not always visible as it was not in seen 1996 (Murphy and Allen 1996). The lower part of the beach is sandy, sometimes soft sand and with a few silty patches at the low tide limit. The upper part of the beach is quite stony with large and very large pebbles (Photo. 10). Cutting both the shingle and the centre of the beach there is a meandering stream as the tide falls (Photo. 11). To either side of the beach there are outcrops of rock.

The beach was partly examined at the same time as the Amroth beach and the rest later together with the visit to Saundersfoot beach. Parts of the submerged forest were observed on both occasions.

The stream that crosses the beach must be eroding the submerged forest deposits to some extent. The beach is a popular holiday destination and the lower part of the beach is also used for collecting razor shellfish. These activities do not appear to be causing drastic depletion of the archaeological resource. However, the timbers in the upper beach are particularly vulnerable to rough sea action and must be at risk from unwitting public activity.

PRN 48138 (Photo. 12) two stumps or posts at very low tide limit. These were not visible on the later visit although the tide was lower. Possibly they had been revealed by stream scour in the earlier visit. These stumps are probably part of the same area of submerged forest as PRN 48139.

PRN 48139 (Photos. 13-17) area of clay and timber at low tide limit on the western half of the beach. Probably the part of the same area as PRN 48138

PRN 48140 (Photos. 11, 18-20) spread of timbers below and in pebbles on upper part of the beach. In roughly the same location as earlier recorded submerged forest PRN 7791.

The eastern side of the beach was visited on 13/11/2004. The predicted low tide height was 0.63m and a barometric pressure of 1040 reduced this by 0.28m to 0.35m. The western and upper beach was visited on 11/03/2005. The predicted low tide height was 0.10m and barometric pressure of 1026 reduced this by 0.13m to –0.03m. On both visits the conditions were calm and bright.

Saundersfoot (Fig. 5): The beach was walked from Coppat Hall Point, to the north of Saundersfoot, and south to opposite the caravan park, some 650m short of Monkstone Point. Just south of Coppet Hall Point there is a sea defence of large boulders. In front of Saundersfoot and southwards to the harbour there is a sea wall. South of the harbour there is a cliff edge at the top of the beach. The beach itself is very sandy with just a couple of rock outcrops to the north (Photos. 21 and 22). A curvilinear channel crossed the beach from the sea into the harbour. At the lowest extent of the tide there was some silt that was quite soft in places. Nothing of antiquity was noted on the beach. The beach is very popular in the summer and is also used for gathering razor shellfish (Photo. 21).

The beach was visited on 11/03/2005. The predicted low tide height was 0.10m and barometric pressure of 1026 reduced this by 0.13m to –0.03m, making this an exceptional low tide.

Lydstep Haven (Fig. 6): *The southern quarter of the beach is covered in stones and rocks, the upper portion of the beach within normal tidal range is pebbles and sand, the lower tidal limit is mainly sand. However, in the northern part there was one large fragment of peat and a number of small peat and timber deposits. There are very high cliffs, a quarry (PRN 32825) and former quay (PRN 32824) at the southern end of the beach (Photo. 6). The northern end of the beach has a lower cliff. Neither of these cliffs appeared to be significantly eroding. The top of the beach between these cliffs is, all bar one small section, protected by modern sea defences (Photo. 7) of large stones and a short length of gabions. There is a continuing erosion of the undefended section. The middle of the beach is used in the summer for launching powerboats by tractor and trailer.*

This beach is known to have peat deposits towards its northern end near the low tide limit, where a pig skeleton and two microliths were recovered in 1917 (Jacobi 1980 171-175; also cited in Lewis 1992 101; PRN 33459 submerged forest, finds 12241 and 12242). It is obvious that these are from a much larger peat deposit than was surveyed in December 1930 (Lewis 1992 101). It has been suggested that this peat is likely to be late Mesolithic, (Jacobi 1980 174). A radiocarbon date of 5358-4781 BC at 95% probability confirms this suggestion. Lewis (1992) also sampled sediment from the beachhead. A separately recorded submerged forest (PRN 11979) would appear to be wrongly located and may be the same as submerged forest PRN 33459.

The beach was visited on 27/09/2003. The predicted low tide height was 0.4m and a barometric pressure of 1025 reduced this by 0.1m to 0.3m. Low tide GPS visit point SS 0949598439. There was no exposed beach head section as investigated by Lewis. However, there were scattered small peat and peat and timber deposits in the northern third of the beach, which are listed below:

PRN 48124 (Photo. 8), small fragment of grey clay and one fragment of wood SS0936098378

PRN 48125 (Photo. 9), intermittent timber and clay, south end SS0935798390

PRN 48126 (Photo. 10), expanse of peat/clay c. 1.5m wide and nearly 20m long running SSE to NNW, southern end SS 0949798449

PRN 48127 (Photo. 11), northernmost peat/clay, semi-linear deposit, SS0950898499

PRN 48128 (Photo. 12), timber c. 3.5m long and possibly another below at right angle c. 1.5m long, SS0935298430

PRN 48129 small fragment of peat, most westerly deposit, stands 0.2m high, SS0933098410

PRN 48130 Lump of peat c. 3m x 2m and 0.15m high about 7m south of PRN 48128, SS0935298423

This beach was visited again on 11/01/2005. The predicted low tide height was 0.55m with a barometric pressure of 1008 increasing this by 0.05m to 0.60m. Although this tide was not particularly low, there had been gale force winds blowing over the New Year and the preceding few days and therefore, suspecting storm damage, it was decided to monitor this beach again. There was a near southerly gale blowing, with squalls of rain, and the sea was surging on the low tide limit (Photo. 23). The timber and peat deposits were dispersed and in general appeared smaller than seen in the earlier visit. Some of these deposits are likely to be the same but have been given new numbers below, and where it is considered that these relate to earlier references, these are suggested but cannot be certain due to the limited accuracy of the GPS unit. It appears that submerged forest and buried solid deposits are being exposed and have been eroded over the last few years. The speed and extent of this erosion is difficult to quantify due to the changing sand cover but: further monitoring, surveying and some rescue of information before it is lost would appear to be appropriate action.

PRN 48130 Lump of peat c. 3m x 2m and 0.15m high about 7m south of PRN 48128, SS0935298423

PRN 48141 (Photo. 24) Small lump of clay/peat. SS093842984000. Could be the same as PRN 48125

PRN 48142 (Photo. 25) small spread of clay and wood. SS0935598385. Could be the same as PRN 48125

PRN 48143 (not photographed) Two small patches of clay and timber just over 1m in diameter. SS0935498436. Same as PRN 48130?

PRN 48144 (Photo. 26) Small patch of clay and timber. SS0935598436. Same as PRN 48144?

PRN 48145 (Photo. 27) Clay and timber with possible heat-affected flint. SS0935598446

PRN 48146 (Photo. 28) Patches of clay that also extended just below the sand in an area c. 15m by 15m. SS0937098480

PRN 50675 (Photo. 29) Linear patch of clay with peat above. SS0938098513. Could be a continuation of PRN48127

PRN 50676 (Photo. 30) Lump or stump of timber with peat nearby. SS0945698527

Freshwater East (Fig.7): This sandy beach is situated at the end of a valley just below sand dunes with cliffs to either side. A number of flints of the Mesolithic or Neolithic period

have been recovered form the area (appendix 3), but some are poorly located and probably do not come from the beach or adjacent area.

Visited by Polly Groom, on 29th October 2004

The visit was undertaken after two days of bad storms, and at a low tide (0.89m). The storms had resulted in a lot of debris being deposited on the beach, above the normal high water mark, and also in the overall sand level on the beach dropping visibly from its usual level.

A metal, spherical object (Photo. 31) was noted washed up near the rocks. It is unknown whether this had come ashore during recent storms or whether it had been there for some time. The object was about 1m in diameter, with an original hole in one end. A hole in the top appears to be later damage. Inside, a further metal object was contained. It seems likely that this is an old-style metal buoy. This object was located at SS02449 98092 (Fig. 6, A)

A small piece of peat (Photo. 32), attached to a lump of conglomerate rock, was noted washed up on the beach. This piece is around 20 x 25cm and contains obvious plant material. The source of the peat is unknown – there were no clear sources nearby, nor on the beach as a whole. It had clearly been washed in from another deposit elsewhere. This was found at SS02293 98099 (Fig. 6 B)

A piece of shaped timber, with a hole in one end (Photo. 33) was collected from the debris washed up on the beach. The wood had smoothed, rounded edges, presumably from wave action, but was otherwise in good condition.

At the landward edge of the beach, the sand dunes had been partly eroded by the waves, resulting in an abrupt ± 0.15m drop from the edge of the dunes down onto the beach rather than the gradual slope which was there previously. Within this exposed 'section' there was no evidence for buried soil horizons, though different layers within the profile indicated different phases of sand deposition. However, PCNP have carried out conservation and sand-dune stabilisation works in this area in the past so it is likely that, if there are any surviving soil horizons, these will be further inland, in the area of oldest dunes.

Blucks Pool (Fig. 8): This beach is situated in a small cove with sand dunes on its inner edge and cliffs to either side. The upper part of the beach is sand and shingle; there is a large amount of rocky outcrops towards on both sides and towards the low water mark (Photo. 34). A grave of unknown date PRN 12818 was located just to the south of the cove. To the north there was one round barrow PRN 536 and to the east two smaller round barrows PRN 512 and 513. These barrows are assumed to be Bronze Age. Also adjacent to the beach are a number of Second World War defences PRN 28785, 28786 and 28797. Nothing of archaeological importance was noted on the beach.

This beach was visited one hour before low tide while undertaking the detailed survey at Frainslake Sands on 18/09/2005; the predicted low tide height was 0.42m and a barometric pressure of 1030 reduced this by 0.17m to 0.25m. The predicted height at low tide was 0.79m.

Frainslake Sands (Fig. 8): *This beach is normally only accessible from Freshwater West as the landward side is bounded by Ministry of Defence land. The beach is sandy with a north-south line of beach pebbles just below the high water limit in the southern third of the beach. In the northern quarter there are outcropping rocks and north of this there are dense rocks extending between the promontories of Great Fursnap and Little Furznap, separating this beach from Freshwater West. At its southern end is another outcrop of*

rocks known as The Pole, which separates this beach from Blucks Pool. The northern and southern ends of the beach are bounded by cliffs (Photos. 13 and 14). Between these cliffs the top of the beach is characterised by fairly stable grass-covered sand dunes (Brownslade Burrows). Further south there is some erosion of these dunes.

An expanse of peat (PRN 515) has produced a large number of flint implements, including a number of microliths of Mesolithic date (10,000 to 4,000 BC) and a bone tool. This peat reportedly contained gorse, birch, hazel and alder as well as producing charcoal and it is suggested that this peat is likely to be late Mesolithic, c. 4,000 BC (Jacobi 1980 174), although it has not been independently dated. The primary sources of this information have not been checked, but they may relate to an area just inland, rather than to deposits on the beach. Other sites (PRNs 1255, 7465, 7508, 7747, 12244 and 12461) are poorly located and probably come from Brownslade Burrows, just inland of the beach.

This beach was visited on 26/10/2003; the predicted low tide height was 0.4m and a barometric pressure of 1022 reduced this by 0.1m to 0.3m. Three linear peat deposits, one quite large, were observed below the pebbles in the upper part of the beach, as well as peat deposits at the bottom of the tide limit, all in the southern part of the beach. These peat deposits are listed below but collectively were probably originally recorded under the single PRN 515. A deer antler was recovered during this visit from the largest peat deposit PRN 48120. These peat deposits would appear to be the most archaeologically rich of all those on the Pembrokeshire coast.

Low tide GPS visit points visited: SR 8882197790, SR8864297975, SR8858098185, SR8849198568 and SR8831298989.

PRN 46118 peat deposit c. 20m NS, 5m NW at bottom edge of pebbles, SR8900097862.

PRN 46119 linear peat deposit c. 18m long at bottom edge of pebbles, SR8898597766.

PRN 48120 large peat deposit c. 65m E-W, 19m N-S and 0.5m deep. This deposit is cut by water action on its southern side as well as being eroded by a stream on its western edge. The antler PRN 48132 was recovered from the south-eastern part of this deposit. SR8897897627 and SR8961297627.

PRN 48121 peat lump c. 1.5m x 1.5m and 0.3m high, very near the low tide limit, SR8885497750

PRN 48122 peat and timber c. 0.75m x 0,75m, near the low tide limit, SR8888897804.

PRN 48123 length of exposed peat at the low tide limit, extending north of the low tide line before turning inwards on an inlet where there is a long timber, SR8881897829, SR8881297869, SR8880197885, SR8885097900.

The peat 48120 was the largest deposit seen. Subsequently it was decided that this should be plotted with greater accuracy so erosion could be monitored. Therefore Louise Barker, a surveyor with the Royal Commission of the Ancient and Historic Monuments of Wales, undertook a detailed GPS survey, using an instrument capable of accuracy to approximately 10mm, to establish the exact edges of the peat and establish stations that could be used again for resurvey. The peat and low tide of this survey have been incorporated in the overall map (Fig 8). Detailed of the survey is in the site archive.

Unfortunately there was little peat showing on this re-visit with none visible in the locations from the previous visit. There was one linear deposit of peat PRN 50684 (Fig. 8, Photos. 35 and 36), not as prominent as when peat PRN 48120 was seen in 2003, but certainly a continuation of the same deposit, but further down the beach. Near this peat deposit were three iron posts, two of which were still standing. These posts are likely to date from Second World War activity. What these posts show is that the southern lower

part of the beach had been scoured of sand, whereas the higher part around peat deposit PRN 48120 has been re-buried.

This beach was visited on 18/09/2005; the predicted low tide height was 0.42m and a barometric pressure of 1030 reduced this by 0.17m to 0.25m.

Freshwater West: Although not revisited as part of the project, nor the low tide line walked, it was seen during the summer holiday of 2005 at low tide. No peats were visible on the beach.

The beach is sandy with rocks to the south between the promontories of Little Fursenip and Great Furzenip. There are cliffs at either end of the beach and between these are massive sand dunes (Photo. 23) with some erosion, apparently mostly caused by visitors rather than natural processes. Between the upper tide limit and the dunes there is a considerable amount of rubbish.

A submerged forest PRN 11976 is recorded off Little Fursnip promontory; possibly this should be recorded just to the north as this is where Lewis (1992 127) records a foreshore peat deposit. A sample of wood and peat from this location was radiocarbon dated to 5209-4543 BC at 95% probability (Seymour 1980 349). Lewis's test pit C2 in the dunes at the far north of the bay produced two flints PRN 48131 (1992 131). Mesolithic occupation (PRN 503) and Bronze Age finds are recorded at the low tide limit, and a substantial Bronze Age hoard (PRN 14393) was found by a detectorist about two thirds of the way down the beach. This hoard consisted of twenty-eight bronzes, of which five are recognisable objects as three socketed axes and two blades.

This beach was visited on 26/10/2003; the predicted low tide height was 0.4m and a barometric pressure of 1022 reduced this by 0.1m to 0.3m. There was no evidence of the submerged forest PRN 11976 either off Little Furznip or just to the north. The beach was well covered in sand and only slightly cut into by the stream draining from Castlemartin Gorse. The high tide and low tide limits of the beach were walked as well as an intermediate transect. Low tide GPS visit points visited: SR8831298989, SS8813199553, SM8783200108 and SM8754100562.

Gelliswick Bay, Milford Haven (Fig. 9): This beach was visited because a member of the public, Mr Selwyn Lawrence, had reported remains of a small timber structure near the top of the beach.

This bay fronts onto Milford Haven (Photos. 37 and 38) To the east there is a low cliff protected by a large stonewall and former small former jetty projecting south. Above this are the substantial remains of one of the waterway's post-medieval defences, Hubberston Fort PRN 7623. The west side also has a low cliff from which extends a large modern jetty. At the top of the beach there is shingle between the cliffs and a low sea wall. A concrete slipway extends from the sea wall onto the beach and is used by the Pembroke Yacht Club. The lower part of the beach is of mud and sand.

PRN 56077 (Photo. 39) was a small wooden structure at an angle to the sea wall. A post with thin planks on either side was visible. This did not appear to be part of a wreck and its function was not clear. Mr Lawrence undertook a drawing and a copy will be held in the archive.

PRN 56078 was a buried clay soil below the shingle, of uncertain age and not necessarily ancient.

While looking at the timber structure Mr Lawrence said that the bay was used for dismantling Sunderland Flying Boats. Although there are some small bits of debris on the beach none was necessarily from this dismantling. Mr Lawrence also mentioned that there were two wrecks towards the modern Jetty to the west. As it was near low tide these were

investigated. The two wrecks, eastern PRN 56079 and western PRN 56079, are probably the lower parts of the vessels and may have been partly dismantled. The dimensions of these boats could not be ascertained as they were just awash with the tide starting to turn (Photo. 40). Both vessels were of wooden construction, but around the eastern wreck there were a number of iron bands, although these may not belong to it. These boats are possibly the remains of trawlers or small coasters.

This beach was visited on 21/09/2005; the predicted low tide height was 0.62m and a barometric pressure of 1026 reduced this by 0.13m to 0.49m.

St Brides Haven: *A small rocky cove with drying sandy centre, low eroding cliff around a limekiln to the east. In the exposed cliff edge a number of graves have been exposed (PRN 7606; Photos. 30 to 33). Bones from one stone-lined (cist) grave were dated to possibly pre-Norman times (radiocarbon date AD 894-1209 at 96% probability). However, bones from another grave date only from around the 1800s. This part of the low cliffs continues to slowly erode and is now 1.15m to 1.25m in front of a wooden fence. As far as can be ascertained from photographs from 1990, only about 150mm has eroded over the last 14 years. There are still a number of probable exposed graves including possible stone-lined graves in the cliff face. The slow losses of these graves are of considerable archaeological concern. The slow steady erosion will continue but more dramatic loss is a distinct possibility during severe winter storm. A small amount of loss was noted between June 2003 and March 2004 (Photos. 32 and 33). Visit 14/6/2003 about 1 hour before low tide height 0.69m (c. 1.19m).*

The exposed cliff section with the graves was recorded in the summer of 2005 as part of the Pembrokeshire Cemeteries Project (Ludlow 2005). These exposed sections were also revisited as part of this project on 01/02/2006. There was no noticeable change, but some of the edges of the cist graves remain vulnerable to even slight erosion.

Nolton Haven: This beach was revisited during the summer of 2005 but not at a low tide. There was no noticeable change from the last inspection.

The beach was well covered with sand with a few rocks protruding. Visit 16/6/2003, 1.5 hours before low tide height 0.77m (c. 1.47m). High pressure probably reduced tide height by further 0.1m. Nothing of antiquity was seen.

Newgale Sands: This beach was revisited many times during 2004 and 2005, including on 11/01/2005 after the winter storms (Photo. 41). There was no noticeable change from the last report.

The beach was almost totally covered with sand with no exposed pebbles or peat deposits. The top of the beach is mostly a storm-beach bank of pebbles but with high cliffs at both the northern and southern ends. Over the last few years the peat deposits and submerged forest (PRN 12991) have been exposed during winter gales. A number of Mesolithic flints (PRN 9835) have been recovered from the far north end of the beach (Cwm Beach), possibly coming from the eroding cliff top. A Bronze Age palstave (axe) (PRN 14279) was found c.1990 approximately opposite to the former filling station. Further Bronze Age artefacts including a dirk, not yet on the SMR or NMGW data bases, were found early in 2000 after winter storms when a metal detectorist was working the beach, from about 150m west of Pinch Cottage. A number of medieval and post-medieval artefacts, also found by detectorists, have been recorded under the recent Portable Antiquities Scheme by the National Museum of Wales. However, these later finds are not accurately located. This beach was viewed on a number of occasions during the summer, including 30/8/2003 low tide height 0.58m. Nothing of antiquity was seen.

Solva harbour entrance: The harbour was visited many times during 2004-5. There was no noticeable change from the last report except the wall base to the northeast of the

Sand Quay could not be seen and may have been damaged or buried by the dozer rebuilding the Sand Quay slipway.

High cliffs surround the entrance. At low tide there is an expanse of sand with a small pool of water. This beach was viewed on a number of occasions during the summer including 29/8/2003 low tide height 0.63m. Nothing of antiquity was seen. Around the inner part of the harbour there are a number of features (see appendices); the only one that is vulnerable is the remains of a wall base to the northeast of the Sand Quay, which may relate to the earlier crossing point across the harbour bed.

Whitesands Bay: This beach was revisited during the summers of 2004 and 2005, including on 11/01/2005 just after the winter storms. There was little change since the last visit except for the erosion, noted previously in the seaward edge of the mound by St Patrick's Chapel (PRN 2638), which was continuing but has now been repaired.

The beach was well covered with sand and there was no visible sign of the submerged forest or peat deposits (PRN11978). Lewis (1992, 152) reported finds published in 1885 included a flint from "the clay below the forest", and also discovery of red deer antlers, a jawbone from a brown bear and insect remains from unspecified foreshore locations (PRN 48233). Recovered from the foreshore peat were the remains a red deer and two aurochs (very large prehistoric wild cattle), one female (radiocarbon date 3503-2941 BC at 96% probability), the other probably male (PRN 13360). At least two Bronze Age palstaves (PRN s11234 and 14278) have come from near the peat deposits on the beach and it is possible that others have been recovered but not reported. A small gold nugget of possible Late Bronze Age date was found by a metal detectorist in 1996 and is in the NMGW collection but apparently not yet on their database. There have been rumours of a Bronze Age wreck but this cannot be confirmed. A spindle whorl, slag, and a flint scraper recorded from the north of the beach probably derive from Trwynhwrddyn promontory – their grid references are imprecise. Lewis (1992, 153) records another flint from this promontory in a test pit. A considerable number of artefacts, mostly flints, are recorded by NMGW but again are poorly located and likely to be from just inland (Appendix 4).

There are high cliffs along the southern half of the beach, becoming lower towards the middle section. There was little or no active erosion. North of this is an area of sand dunes and a mound covering St Patrick's Chapel (PRN 2638). Adjacent to the mound, the sea defences have been breached in one small place and erosion is taking place; this could easily be repaired.

Visit 12/6/2003 low tide height 1.06m. High pressure probably reduced tide height by further 0.1m. Nothing of antiquity was seen.

Aber Mawr (Fig. 10): This beach was revisited on 12/3/05 about 1 hour after low tide, which was still just below the peat deposits located on the upper part of the beach and into the beachhead shingle. There was one new area of exposed peat, but nothing in the shingle, as on the previous visits. This beach is a SSSI.

PRN 56081 An extensive area of clay and peat extending for about 35m along the beach. SM8820134600.

PRN 56082 Peat clay and timbers at the base of the shingle. SM8817834534. This may be part of the same deposit as PRN 48117.

The beach is well covered with sand with an upper storm beach of pebbles. In the southern part of the pebble bank, stream scours expose peat deposits and wood of the submerged forest PRN 32832. These peat deposits were re-plotted (PRN 48117) and start nearly 60m south of the stone outcrop in the pebble beach. Note that the GPS locations for these peat deposits (PRN 48117) may have a relative bias to the east.

Nearly 50 flints or fragments of flints (PRN 7390) were recovered in a tilled area behind the storm beach and are probably Mesolithic (Dunn 1968). Another assemblage (PRN 48134) including a microlith were found by an archaeological tutor and students beneath the intertidal peat. Lewis (1992, 172, 177) found three more flints (PRN 48135) from one of his test pits behind the storm beach. Radiocarbon dating on the peat deposits in one of these test pits indicated that the valley peat commenced 7028-6110 BC at 96% probability with later peat dated to 3366-2933 BC at 96% probability. Timber and peat is recorded on the seaward side and below the pebble beachhead; unusually these timbers are not oak (pers comm Nigel Nailing; Seymour 1980 348).

Brunel had proposed Aber Mawr as a rail and sea terminus to Ireland. Remains can still be seen of embankments, piers, breakwaters and a ledge for the station. This construction was abandoned in 1848 and the terminus was later located at Fishguard. The large pebble bank has only been here since 1859 when a fierce storm forced mountainous seas into the bay. The first Atlantic telegraph cable was laid from the north end of this beach across to Ireland in 1873.

This beach was visited at the beginning of January 2003 when more timber was visible below the storm beach just into the sand These timbers may now have been lost. Visit 12/6/2003 low tide height 1.06m. High pressure probably reduced tide height by further 0.1m.

Newport Sands (Fig. 11) This is a large sandy beach, open to the west, immediately to the north of Newport and on the north side of the estuary of the river Nyfer. South of this river the bank is known as the Parrog, and was not examined as part of this project. The inner part of the estuary has been dealt with separately as Pen-y-Bont, below. There are extensive sand banks that are uncovered at low tide and very popular in the summer. The inner edge of the beach is bound by sand dunes around The Bennet Golf Course, except for the far north end that has rocky cliffs (Photo. 44).

This beach has a record for a submerged forest PRN 32042 (grid reference SN4050). It is poorly located and appears to relate to Lewis' thesis test pits (1992, 203) the site of which was near Pen-y-Bont, and should be located at SN0618039460. There were a number of Mesolithic flint working floors 32044-46 located in the adjacent sand dunes, recorded in a survey of Cardigan Bay (Sambrook and Williams 1996, 81-87).

This beach was visited on 12/03/2005; the predicted low tide height was 0.15m and a barometric pressure of 1010 increasing the height by 0.03m to 0.18m. Both the high and low tide limits were walked. Nothing of antiquity was seen.

Pen-y-Bont, Newport: The inner part of the estuary of the Afon Nyfer between Newport Sands and the bridge over the Nyfer was included in this project because of peat deposits investigated by Lewis (1992 202-211) on the southern bank just below the bridge. Here also were recovered around 70 pieces of flint in 1923, PRN 1466, possibly associated with a group of stones PRN 1467; in 1973 further flint cores and blades were observed, also PRN 1466. A radiocarbon date from the peat close to the 1923 site gave a determination of cal BC 2138-1772 at 95% probability. This area was also included in the Cardigan Bay Survey (Sambrook and Williams 1996, 81-87).

This part of the estuary is mud banks bounded by some rock outcrops and small dirt cliffs and salt marsh, the latter of which is the main feature of the southern bank (Photo. 45).

Some peat could be seen below the salt marsh on the south bank. However, the surrounding mud was soft and no detailed observations were made. There would appear to be a little erosion in some areas of the bank at this location, but also some growth of the salt marsh. There was some recent 19^{th}-20^{th} material in the mud and salt marsh as

also noted by Lewis (1992, 204). In the general area of this part of the estuary there was a lot of unsightly modern rubbish, particularly plastic.

This part of the estuary was visited on 12/03/2005 on the same occasion as Newport Sands; the predicted low tide height was 0.15m and a barometric pressure of 1010 increasing the height by 0.03m to 0.18m. Both the high and low tide limits were walked. Nothing of antiquity was seen.

Discussion and General Recommendations

The results obtained and therefore the recommendations are very similar to those in the earlier report. Peat deposits were seen at Amroth, Wiseman's Bridge, Lydstep Haven, Frainslake Sands, Aber Mawr and the riverine deposit at Pen-y-Bont, Newport. It appeared that southern facing beaches have been subject to some erosion during 2004-5. At Frainslake Sands the area of peat deposits previously observed were covered by sand but an adjacent area was just revealed.

It is known that the gales of early 2000 damaged the peat deposits on Newgale Beach and similar rapid erosion is likely to occur to these deposits on any of the exposed beaches of Pembrokeshire whenever there is severe weather; it is also known that this is the most likely time for the peat to be revealed. It is evident that the fish trap recorded in the report of the Sea Empress Oil Spill (James 1997) on Tenby South Beach has become unrecognisable within the last few years.

There are few foreshore peat deposits around the coast, and these would appear to date from the Mesolithic period. What is surprising is the number of these deposits that have produce artefacts from the later part of that period: Lydstep Haven, Frainslake Sands, Freshwater West, Whitesands Bay and Aber Mawr. Bronze Age artefacts have been found in the peat at Newgale and Whitesands Bay. These objects would appear to represent a preference for prehistoric activities within these environments.

What is manifest is that the foreshore peats are of prime archaeological importance and also have considerable palaeoenvironmental value. It is important that any planned foreshore work, which may be on or adjacent to these peat deposits, should be avoided if at all possible: if not, a programme of archaeological work and analysis must be undertaken beforehand. Additionally, it is paramount that any emergency work, for example after an oil spill, should have within their procedures actions which should either avoid these important areas or again implement archaeological processes as part of any actions.

From time to time substantial natural erosion, which cannot be stopped, takes place on the foreshore peats. It is imperative therefore that archaeological rescue procedures of recording, sampling and analysis, with funding, are in place so that immediate action can be taken. An additional threat to the foreshore peat artefacts comes from metal detectorists. This detecting activity is difficult to control, and those that undertake this activity should be encouraged to report their results. This activity needs to be monitored and/or evaluated, possibly necessitating by-laws and or supervised screening and recovery.

Individual Recommendations

The only large beach left to examine is that at **Manorbier**; other minor beaches should also be examined in the fullness of time, but are unlikely to contain substantial buried soil deposits.

Amroth: There would appear to be several areas of peat clay and sunken forest on the beach. The area seen in this project is the best observed to date. Therefore, because of its

importance, it is recommended that this beach should be regularly monitored, at least once per year on a low tide, preferably after the winter storms. If possible horse riding and vehicular access need to be kept away from these deposits, as should metal detectorists and razor shellfish collectors. These sites cannot be offered Scheduled Ancient Monument protection, as there are no apparent artificial structural elements. However, this site is legally protected as a Site of Special Scientific Interest (SSSI).

Wiseman's Bridge: There are two separate elements to the sunken forest here, the upper part of the beach below and within the pebbles, and that at the low tide area. A stream cuts through these deposits and obviously changes its course across the beach. Therefore again it is recommended that this beach should be regularly monitored, at least once per year on a low tide, preferably after the winter storms. After further observations it may be advisable to sample some of the timbers, partially in the pebbled area, as they will be damaged by sea action. This site is legally protected as a SSSI.

Lydstep Haven: Erosion has continued on these deposits and the recommendations are as before: *it is recommended that those operating tractor launching of boats from the beach are made aware of the peat deposits to the northern end of the beach and if possible a programme of rescue recording and sampling should be implemented. As these peat and wood deposits are patchy, major excavation of the larger remaining areas could be justified given their eroded and eroding nature.* This site is **not** legally protected as a SSSI.

Frainslake Sand: The southern part of this beach now has an accurate survey. It is recommended that this part of the beach be monitored at low tide at least once per year. This site is legally protected as a SSSI. The further recommendations remain as before: *given that this would appear to be the most archaeologically significant foreshore peat deposit, surface collection and sampling should take place in the immediate future, then monitor on a yearly basis, possibly with- re-survey in 5 years' time.*

Gelliswick Bay: Neither the timber structure or the buried soil appeared to be of great significance. However, the wrecks warrant rapid recording, by a small team on a very low tide.

Aber Mawr: These recommendations as before: *recommend that the National Trust and/or Countryside Council for Wales, who already have a vested interest in the environment there, be asked to monitor the erosion on the beach peats and timbers several times per year. It would be expected that further sampling and analysis should be undertaken within the near future.*

Pen-y-Bont, Newport: It is recommended that the southern bank is monitored at least once per year to see if active erosion is occurring. This would not have to be done on very low tides, as it is quite high up. Consideration should also be made to make the area of the southern bank a SSSI, so no flood defence scheme, or such, accidentally disturbed these deposits without consultation.

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Appendix 1 Effects of atmospheric pressure on tide height

(from Practical Boat Owner)

Barometric Pressure	Difference in cm
963	+50
973	+40
983	+30
993	+20
1003	+10
1013 (norm)	0
1023	-10
1033	-20

Tidal height calculations used to adjust for time of low water

The tide will rise or fall according to approximate proportion of its range as below. Figures in brackets are the decimal multipliers

1st hour = 1/12(0.08)
2nd hour = 2/12 (0.16)
3rd hour = 3/12 (0.25)
4th hour = 3/12 (0.25)
5th hour = 2/12 (0.16)
6th hour = 1/12 (0.08)

Appendix 2 Sites and Monuments Record

Pre-dating this project
from Amroth clockwise around the coast to Newport, Pembrokeshire

Amroth

PRN	NAME	NGR	TYPE	PERIOD
3658	AMROTH SHORE	SN16370696	FLINT WORKING SITE	Mesolithic
3660	AMROTH SHORE	SN16760710	FLINT WORKING SITE	Mesolithic
7999	AMROTH	SN16220687	SUBMERGED FOREST	Prehistoric
8000	AMROTH (East)	SN177070	SUBMERGED FOREST	Prehistoric
8495	WATER'S EDGE THE	SN17400728	BOUNDARY STONE?	Post Med
19653	EBENEZER CHAPEL	SN16450707	CHAPEL	Post Med
21708	NEW INN	SN17270728	FARMSTEAD	Post Med
21709	COLE PITS	SN176073	COAL MINE?	Post Med
23516	BLACK HALL COTTAGE	SN17300728	COTTAGE	Post Med
23517	NEW INN COTTAGE	SN17440729	COTTAGE	Post Med
24785	AMROTH CLIFF	SN16100691	QUARRY?;NATURAL FEATURE?	Post Med
24786	AMROTH CLIFF	SN15670677	BLACKSMITHS WORKSHOP?	Post Med
29930	AMROTH CLIFF	SN15500665	BUILDING?;ENCLOSURE?	Post Med
30062	WISEMAN'S BRIDGE TO AMROTH CLIFF	SN151064	MINE	Post Med
30063	WISEMAN'S BRIDGE TO AMROTH CLIFF	SN15220644	MINE?	Post Med
30064	AMROTH	SN16180696	SEA DEFENCES	Post Med?;Modern?
32827	UNKNOWN	SN17150724	BUILDING	Post Med
32828	AMROTH BRIDGE	SN18320728	BRIDGE	Post Med
33783	AMROTH	SN16750716	MINE	Post Med
33784	AMROTH	SN16750716	BUILDING	Post Med
33785	MROTH BEACH	SN171070	SUBMERGED FOREST	General
46273		SN173073	BEE BOLE	Unknown

Wiseman's Bridge

7994	WISEMAN'S BRIDGE	SN146060	SUBMERGED FOREST	Prehistoric
18903	WISEMAN'S BRIDGE	SN14520608	BRIDGE	Post Med
23833	WISEMAN'S BRIDGE IRON PATCHES; BRIDGE PATCH;LLOYDS;CICKDAM; BURROWS	SN1506	IRONSTONE MINE	Post Med
26598	WISEMAN'S BRIDGE	SN145061	SETTLEMENT	Post Med
30057	SAUNDERSFOOT - STEPASIDE TRAMWAY	SN14350578	MINE	Post Med
30061	WISEMAN'S BRIDGE	SN1457606114	UNKNOWN	Modern?

	CANAL			
32810	WISEMAN'S BRIDGE	SN14440587	WELL	Post Med
35445	WISEMAN'S BRIDGE COAL FOLD	SN145060	COAL YARD	Post Med
35452	WISEMAN'S BRIDGE	SN14540614	INN	Post Med

Saundersfoot

PRN	NAME	NGR	TYPE	PERIOD
5713	SAUNDERSFOOT RAILWAY	SN1405	RAILWAY	Post Med
19651		SN14130376	SHAFT	Post Med
23792	HEAN CASTLE BRICKWORKS	SN1405	BRICKWORKS	Post Med
29918	SWALLOW TREE GARDEN	SN1415103769	LIME KILN	Post Med
29919	SWALLOW TREE GARDEN	SN14170381	SHAFT	Modern
29920	RHODE WOOD	SN13930415	LIMESTONE QUARRY	Post Med
30058	SAUNDERSFOOT - STEPASIDE TRAMWAY	SN14240557	MINE	Post Med
30059	SAUNDERSFOOT - STEPASIDE TRAMWAY	SN14360548	SEA DEFENCES	Post Med
30097	COPPETT HALL	SN13970525	CULVERT	Post Med?
32753	SAUNDERSFOOT HARBOUR	SN13760456	BUILDING	Post Med
32801	TREVAYNE WOOD	SN14150377	BRIDGE	Post Med
32803	SAUNDERSFOOT HARBOUR	SN13760455	QUARRY	Post Med
32804	THE GLEN	SN13830434	FOOTBRIDGE	Modern
32805	RHODE WOOD	SN14020403	BELL PIT	Medieval?;Post Med?
32807	SAUNDERSFOOT HARBOUR	SN13730485	SLIPWAY	Modern
33778	SAUNDERSFOOT HARBOUR	SN13760455	LIME KILN	Post Med
33779	SAUNDERSFOOT HARBOUR	SN13840456	SLIPWAY	Post Med
33780	SAUNDERSFOOT HARBOUR	SN13620464	BLACKSMITHS WORKSHOP	Post Med
33782	SAUNDERSFOOT HARBOUR	SN13870466	LIGHTHOUSE	Post Med
38755	SAUNDERSFOOT	SN137048	PROJECT RECORD	General

Lydstep Haven

PRN	NAME	NGR	TYPE	PERIOD
11678	LYDSTEP HAVEN	SS094985	FINDS	Prehistoric
11979	LYDSTEP HAVEN	SS092978	SUBMERGED FOREST	Prehistoric
32824	LYDSTEP HAVEN	SS09269779	QUAY	Post Med
32826	LYDSTEP HAVEN	SS09109820	SLIPWAY	Modern
33459	LYDSTEP HAVEN	SS094984	SUBMERGED FOREST	General

Freshwater East

PRN	NAME	NGR	TYPE	PERIOD
4195	FRESHWATER EAST	SS024981	FLINT WORKING SITE	Mesolithic
4196	FRESHWATER EAST	SS024981	FLINT WORKING SITE	Mesolithic
4197	FRESHWATER EAST	SS01989801	FLINT WORKING SITE	Mesolithic
4201	EAST TREWENT FARM	SS01699779	FLINT WORKING SITE	Mesolithic;Neolithic
4202	LAMPHY	SS01729772	FLINT WORKING SITE	Mesolithic
4203	FRESHWATER EAST	SS02259813	FLINT WORKING SITE	Mesolithic;Neolithic
7749	FRESHWATER EAST	SS0298	FINDSPOT	Prehistoric
11141	FRESHWATER EAST	SS0298	FINDSPOT	Neolithic
12259	FRESHWATER EAST	SS0298	FINDSPOT	Mesolithic
32788	FRESHWATER EAST	SS02059814	COTTAGE	Post Ned; Modern
32789	FRESHWATER EAST	SS01989803	BUILDING	Modern

Blucks Pool

PRN	NAME	NGR	TYPE	PERIOD
506	CASTLEMARTIN	SR8997	FINDSPOT	Mesolithic
507	CASTLEMARTIN	SR8997	ARTEFACT SCATTER	Bronze Age
508	CASTLEMARTIN BURROWS	SR8997	SETTLEMENT	Roman
509	CASTLEMARTIN	SR8997	FINDS	Dark Age
511	LINNEY BURROWS	SR8886796963	ROUND BARROW	Bronze Age
512	LINNEY BURROWS	SR89219725	ROUND BARROW	Bronze Age
513	LINNEY BURROWS	SR89199725	ROUND BARROW	Bronze Age
516	LINNEY BURROWS	SR8997	FINDSPOT	Bronze Age
517	CASTLEMARTIN BURROWS	SR8997	SETTLEMENT	Roman
534	LINNEY	SR89389708	OCCUPATION SITE	Unknown
536	CROW BACK TUMULUS;FREYNESLAKE TUMULUS	SR8897797483	ROUND BARROW	Bronze Age
537	UNKNOWN	SR8997	FINDSPOT	Neolithic
538	FRAINSLAKE	SR8997	FINDSPOT	Bronze Age
1243	CASTLEMARTIN FLOORS	SR8997	FINDSPOT	Bronze Age
1253	CASTLEMARTIN BURROWS	SR8997	FINDSPOT	Neolithic
6969	LINNEY	SR89259692	FARMHOUSE	Medieval;Post Med
7503	LINNEY BURROWS	SR8997	FINDSPOT	Prehistoric
7509	FRAINSLAKE	SR8997	FINDSPOT	Prehistoric
7538	LINNEY	SR89389708	FINDSPOT	Prehistoric
7748	LINNEY BURROWS	SR8997	FINDSPOT	Prehistoric
10103	LINNEY BURROWS	SR8997	FLINT WORKING SITE?	Mesolithic
10590	LINNEY BURROWS	SR8997	FINDSPOT	Prehistoric
10592	CASTLEMARTIN BURROWS;LINNEY BURROWS?	SR8997	FINDSPOT	Mesolithic
12818	BLUCKS POOL	SR888971	INHUMATION	Unknown

14631	BERRY SLADE	SR8843796968	UNKNOWN	Unknown
26301	BLUCKS POOL	SR8900897004	LIME KILN	Post Med
26312	LINNEY	SR8886896939	QUARRY	Post Med
26448	HOLY COTTAGE	SR8875896924	COTTAGE	Post Med
26485	BLUCKS POOL COASTGUARD STATION	SR8903996972	COASTGUARD STATION	Post Med
26505	BLUCKSPOOL	SR8899096998	QUARRY	Post Med
27079	LINNEY	SR89259692	SETTLEMENT	Post Med
28774	LINNEY DOWN CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8922896871	BLOCKHOUSE	Modern
28775	LINNEY DOWN CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8934196902	BLOCKHOUSE	Modern
28782	LINNEY BURROWS CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8915997280	BLOCKHOUSE	Modern
28783	LINNEY BURROWS CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8919797348	GUN EMPLACEMENT	Modern
28784	LINNEY BURROWS CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8929997217	TRAINING STRUCTURE;DEFENCE POST	Modern
28785	BLUCKS POOL LINNEY BURROWS CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8894597375	TRAINING STRUCTURE;DEFENCE POST	Modern
28786	THE POLE LINNEY BURROWS CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8886997477	TRAINING STRUCTURE;DEFENCE POST	Modern
28787	CROW BACK LINNEY BURROWS CASTLEMARTIN ROYAL ARMOURED CORPS RANGE	SR8890197506	TRAINING STRUCTURE;DEFENCE POST	Modern

Frainslake Sands

PRN	NAME	NGR	TYPE	PERIOD
515	FRAINSLAKE BEACH; BROWNSLADE BURROWS	SR889979	OCCUPATION SITE	Mesolithic
1255	BROWNSLADE BURROWS	SR8998	FINDS	Neolithic
7465	BROWNSLADE BURROWS	SR8998	FINDS	Medieval
7508	BROWNSLADE BURROWS	SR8998	FINDS	Prehistoric

7747	BROWNSLADE BURROWS	SR8998	FINDS	Mesolithic; Neolithic
12244	BROWNSLADE BURROWS	SR8998	FINDS	Mesolithic
12461	BROWNSLADE CHAPEL	SR8998	CHAPEL	Medieval

Freshwater West

PRN	NAME	NGR	TYPE	PERIOD
503	FRESHWATER WEST	SR88109970	OCCUPATION SITE	Mesolithic
504	FRESHWATER WEST	SR88109970	FINDS	Bronze Age
10094	FRESHWATER WEST	SR885995	FINDS	Mesolithic
11976	FRESHWATER WEST	SR882993	SUBMERGED FOREST	Prehistoric
14393	FRESHWATER WEST	SR882999	HOARD	Bronze Age
33440	ANGLE	SM88040063	WEAPONS PIT	Modern

Gelliswic Bay

PRN	NAME	NGR	TYPE	PERIOD
7623	FORT HUBBERSTON	SM890054	FORT	Post Med
12464	ST THOMAS' CHAPEL	SM889057	CHAPEL	Medieval
34484	GELLISWICK BAY	SM88500565	LIME KILN	Post Med
34512	CLIFF HOUSES	SM88440544	DWELLING	Post Med
34794	GELLISWICK BAY	SM88810565	SLIPWAY	Modern
34795	GELLISWICK BAY	SM88880545	JETTY	Modern
34796	GELLISWICK BAY	SM88900541	SLIPWAY	Post Med

St Brides Haven

PRN	NAME	NGR	TYPE	PERIOD
3138	CLIFF COTTAGES	SM80231094	CHAPEL	Medieval
7606	ST BRIDES CIST CEMETERY	SM80231094	CEMETERY	Early Medieval
23815	ST BRIDES	SM8021510926	LIME KILN	Post Med

Nolton Haven

PRN	NAME	NGR	TYPE	PERIOD
5444	NOLTON HAVEN	SM858183	FINDS	Mesolithic

Newgale Sands

PRN	NAME	NGR	TYPE	PERIOD
2779	CWM MAWR	SM843229	BURNT MOUND	Prehistoric
12227	PEN Y CWM	SM844228	FINDS	Mesolithic
12991	NEWGALE	SM846220	SUBMERGED FOREST	Prehistoric
14279	NEWGALE SANDS	SM84702207	FINDS	Bronze Age
30172	CWM MAWR	SM84322290	FINDS	Prehistoric

Solva

PRN	NAME	NGR	TYPE	PERIOD
2797	SOLVA	SM8024	FINDS	Roman
4645	SOLVA KILNS	SM805242	LIME KILN	Post Med
6387	CAER FARCHELL	SM8024	DWELLING	Post Med
9834	SOLVA	SM8024	FINDS	Iron Age
11178	SOLVA AXE	SM8024	FINDS	Neolithic
12228	SOLVA HARBOUR	SM800240	FINDS	Mesolithic
12348	SALVACH	SM8024	SETTLEMENT	Medieval
32621	SOLVA	SM80152410	LIFEBOAT STATION	Post Med
32622	SAND SLIP;SAND QUAY	SM80312417	QUAY;SLIPWAY	Post Med
32710	SOLVA	SM80182412	SPRING	Post Med?
32711	TRINITY QUAY	SM80212412	QUAY	Post Med
32712	SOLVA	SM80212412	QUARRY	Post Med?
32713	SOLVA HARBOUR	SM80232399	LANDING POINT	Modern?
32714	SOLVA HARBOUR	SM80532427	SLIPWAY	Modern

Whitesands Bay

PRN	NAME	NGR	TYPE	PERIOD
2634	TY-GWYN	SM73312740	INSCRIBED STONE	Early Medieval
2638	ST PATRICKS CHAPEL	SM73372723	CHAPEL	Early Medieval;Medieval
7353	PWLLEUOG	SM733274	FINDS	Prehistoric
7355	TY GWYN	SM732273	FINDS	Prehistoric
11234	WHITESANDS BEACH	SM73272715	FINDS	Bronze Age
11371	TRWYN HWRDDIN;RAM'S NOSE	SM731274	FINDS	Neolithic
11978	WHITESANDS BAY	SM733270	SUBMERGED FOREST	Prehistoric
13360	UNKNOWN	SM73252715	FINDS	Prehistoric?
13949	TRELEDDYN	SM728262	COMMON LAND	Medieval;Post Med
14278	WHITESANDS BEACH	SM73182714	FINDS	Bronze Age
25484	PORTHSELAU	SM726260	MINING FEATURE	Post Med
30677		SM73302726	FINDS	Unknown
32605	CRAIG Y CREIGWYR	SM73152762	QUARRY	Unknown
32611	PORTH MAWR	SM73222663	QUARRY	Unknown

Aber Mawr

PRN	NAME	NGR	TYPE	PERIOD
7390	ABER MAWR	SM882345	FLINTWORKING FLOOR	Mesolithic;Neolithic
16505		SM881344	QUARRY	Post Med
32650	ABER MAWR	SM88283467	BUILDING	Post Med?
32672	ABER MAWR	SM88113437	TUNNEL	Post Med?
32832	ABER-MAWR	SM88103455	SUBMERGED FOREST	General

Pen-y-Bont, Newport

PRN	NAME	NGR	TYPE	PERIOD
1466	NEWPORT BRIDGE	SN06163945	FLINT WORKING SITE	Mesolithic
1467	NEWPORT BRIDGE	SN06163945	UNKNOWN	Unknown
1468	OLD CASTLE;NEWPORT LONG STREET	SN05833950	RINGWORK	Medieval
1492	BEDD SAMSON	SN06293937	UNKNOWN	Unknown
12915	FFYNNON CAREG;FFYNNON CURRIG	SN06213938	HOLY WELL	Medieval
18818	FFYNNON BRYNCYN	SN06233975	HOLY WELL?	Medieval?
21768	NEWPORT BRIDGE	SN06373954	BRIDGE	Post Med
25443	NEWPORT SANDS	SN06133974	LIME KILN	Post Med
31934	NEWPORT BRIDGE	SN06303958	QUARRY	Post Med
31935	NEWPORT BRIDGE	SN06313959	STILE	Post Med
31936	NEWPORT BRIDGE	SN06313950	STEPPING STONES	Post Med
31938	BRYNCYN HOUSE	SN06213957	COTTAGE	Post Med
32043	NEWPORT BRIDGE	SN06283951	FORD	Post Med

Newport Sands

10273	FFYNNON FYRNACH	SN0540	HOLY WELL	Medieval
11473	TREVETHEL	SN0540	SETTLEMENT	Medieval
12956	ST BRYNACH'S CHURCH	SN0540	INSCRIBED STONE	Medieval?
13813	PARRY	SN053397	COMMON LAND	Medieval;Post Med
14002	PARROG;PART OF	SN053407	COMMON LAND	Medieval;Post Med
14348	NEWPORT PAROG	SN052397	PORT	Medieval?;Post Med?
15236		SN05583994	WOOLLEN MILL	Post Med
17306		SN0540	MANSION	Post Med
25535	PARROG	SN051396	TELEPHONE BOX	Post Med
30824	PARROG	SN05123964	LIME KILN	Post Med
31937	NEWPORT BRIDGE	SN0540	FERRY CROSSING	Post Med
31939	THE STOREHOUSE	SN05773988	DWELLING;STOREHOUSE	Post Med
31947	STOREHOUSE	SN05773988	JETTY	Post Med
31948	STOREHOUSE	SN05723996	LANDING POINT	Post Med
31949	STOREHOUSE	SN05723996	QUARRY	Post Med
31965	Y CWM	SN04503980	LANDING POINT	Post Med
31966	Y CWM	SN04493973	LIFEBOAT STATION	Post Med
31967	TRAETH Y BETTWS	SN04633973	WHARF?;HARBOUR?	Post Med
31968	PAROG	SN05003964	WHARF?;HARBOUR?	Post Med
31969	PAROG	SN04973967	FINDS;ORNAMENTAL FEATURE	Post Med
31970	PAROG	SN05043964	WELL	Post Med
32042	NEWPORT BEACH & ESTUARY	SN0540	SUBMERGED FOREST	Mesolithic;Neolithic
32044	CERIGDUON	SN05454070	FLINT WORKING SITE	Mesolithic?
32045	CERIGDUON	SN05454070	UNKNOWN	Unknown
32046	AFON NYFER	SN054401	FLINT WORKING SITE	Mesolithic?
32053	PARROG	SN05203970	SHIPYARD	Post Med
32054	PARROG	SN05203970	QUAY	Post Med

32055	PARROG	SN05203970	WAREHOUSE	Post Med
32056	PARROG	SN05203970	COAL YARD	Post Med
32057	PARROG	SN05223968	LIME KILN	Post Med
32058	PARROG	SN05183970	LIME KILN	Post Med
32059	PARROG	SN05143965	LIFE SAVING APPARATUS SHED	Post Med
32060	BRYN-Y-MOR	SN04893972	SLIPWAY	Post Med
32061	PARROG BOAT CLUB	SN05183971	WAREHOUSE?	Post Med
32062	PARROG	SN05203970	SHIPYARD	Post Med
32063	PARROG	SN05503965	SALT WORKS	Post Med

Appendix 3 Finds from National Museum And Galleries Wales

from Tenby clockwise around the coast to Aber Mawr

Tenby South Beach

Record no	NGR	Material	Object name	Title	Period
20850	SS124991	copper	Token	Private Haverfordwest	Post Medieval

Frainslake Sands

Record no	NGR	Material	Object name	Title	Period
8336	SR889977	chert	natural object	Chert nodule	
18586	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18587	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18588	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18589	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18590	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18591	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18592	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18593	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
18594	SR889977	flint	flake	Prehistoric flint flake	Prehistoric
8338	SR889977	flint	core	Prehistoric core	Prehistoric
18582	SR889977	flint	core	Prehistoric core	Prehistoric
18585	SR889977	flint	core rejuvenation flake	Flint core rejuvenation flake	Prehistoric

Freshwater West

Record no	NGR	Material	Object name	Title	Period
13883	SM882000	bone	metapodial	Red deer metapodial	Prehistoric

Newgale Sands

Record No	NGR	Material	Object name	Title	Period
65665	SM8422	lead	weight	Medieval lead weight	Medieval
13539	SM8422	lead	weight	Post-Medieval	Post-Medieval

				lead weight	
1117	SM8422	brass	Edward IV halfgroat (counterfeit)	Edward IV halfgroat (counterfeit)	15th century, Late
13709	SM8422	lead	shot	Medieval lead shot	Medieval
13849	SM8422	bronze	annular brooch	Medieval bronze ring brooch	Medieval
13850	SM8422	lead	shot	Post-Medieval lead shots	Post-Medieval
70094	SM8422	lead	shot	Post-Medieval lead shots	Post-Medieval
70095	SM8422	lead	Post-Medieval iron object	Post-Medieval lead sheet	Post-Medieval
70096	SM8422	copper alloy	spike	Post-Medieval copper spike	Post-Medieval
13913	SM8422	lead	shot	Post-Medieval lead shots	Post-Medieval
70097	SM8422	copper	bolt	Post-Medieval copper bolt	Post-Medieval
70098	SM8422	wood	tree nail	Post-Medieval wood tree nail	Post-Medieval
70099	SM8422	lead	pipe (smoking)	Post-Medieval lead scupper pipe	Post-Medieval
70093	SM8422	lead	shot	Post-Medieval lead shots	Post-Medieval

Whitesands Bay

Record no	NGR	Material	Object name	Title	Period
12335	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
10107	SM7327	flint	transverse arrowhead	Bronze Age flint transverse arrowhead	Bronze Age
37468	SM7327	flint	knapping debitage	Prehistoric flint debitage	Prehistoric
37469	SM7327	flint	flake	Prehistoric flint retouched flake	Prehistoric
37470	SM7327	flint	flake	Prehistoric	Prehistoric

				flint retouched flake	
37360	SM7327	flint	end scraper	Prehistoric flint scraper	Prehistoric
37361	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
37362	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
37363	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
37364	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
37365	SM7327	flint	core	Prehistoric flint core	Prehistoric
37366	SM7327	flint	core	Prehistoric flint core	Prehistoric
37367	SM7327	flint	blade	Prehistoric flint blade	Prehistoric
38702	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38703	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38704	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38706	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38707	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38708	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38709	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38711	SM7327	flint	knife	Prehistoric flint scraper	Prehistoric
38713	SM7327	flint	flake	Prehistoric flint retouched flake	Prehistoric
38714	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38715	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38716	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38717	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38718	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38720	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38721	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38722	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38723	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric

38724	SM7327	flint	knapping debitage	Prehistoric flint debitage	Prehistoric
38726	SM7327	flint	flake	Prehistoric flint retouched flake	Prehistoric
38727	SM7327	flint	transverse arrowhead	Bronze Age flint transverse arrowhead	Bronze Age
38728	SM7327	flint	plano convex knife	Neolithic / Bronze Age flint plano convex knife	Late Neolithic
38729	SM7327	flint	core	Prehistoric flint core	Prehistoric
38730	SM7327	flint	flake	Prehistoric flint flake	Prehistoric
38816	SM7327	flint	core	Prehistoric flint core	Prehistoric
38818	SM7327	flint	flake	Prehistoric flint flake	Prehistoric
38819	SM7327	flint	flake	Prehistoric flint flake	Prehistoric
38821	SM7327	flint	blade	Prehistoric flint blades	Prehistoric
38823	SM7327	flint	scraper	Prehistoric flint scraper	Prehistoric
38826	SM7327	flint	flake	Prehistoric flint flakes	Prehistoric
38828	SM7327	flint	knapping debitage	Prehistoric flint debitage	Prehistoric
38830	SM7327	flint	flake	Prehistoric flint retouched flake	Prehistoric
38831	SM7327	flint	core	Prehistoric flint core	Prehistoric
38833	SM7327	flint	knapping debitage	Prehistoric flint debitage	Prehistoric
38836	SM7327	chert	flake	Prehistoric chert flake	Prehistoric
38838	SM7327	stone	flake	Prehistoric stone flake	Prehistoric
38842	SM7327	bronze	metalworking waste	Undated copper alloy metalworking waste	
38979	SM7327	flint	scraper	Neolithic / Bronze Age flint scraper	Late Neolithic
38980	SM7327	flint	scraper	Neolithic / Bronze Age flint scraper	Late Neolithic

Appendix 4 New Primary Record Numbers

from Amroth clockwise around the coast to Newport, Pembrokeshire

2003 new sites

PRN	SITE NAME	NGR	Site type	Description	Visit Date
46118	FRAINSLAKE SANDS	SR890097862	PEAT	Linear peat deposit 5m x 20m	22/10/2003
48119	FRAINSLAKE SANDS	SR889859776	PEAT	Linear peat 18m long	26/10/2003
48120	FRAINSLAKE SANDS	SR8897897627	PEAT	Large peat and timber deposit	26/10/2003
48120	FRAINSLAKE SANDS	SR8896129762	PEAT	Large peat and timber deposit	26/10/2003
48121	FRAINSLAKE SANDS	SR8885497750	PEAT	Peat lump 1.5mx1.5mx0.3m	26/10/2003
48122	FRAINSLAKE SANDS	SR8888897790	PEAT	Peat and timber 0.75mx0.75m	26/10/2003
48123	FRAINSLAKE SANDS	SR8881897829	PEAT	Large peat and timber deposit	26/10/2003
48123	FRAINSLAKE SANDS	SR8881297869	PEAT	Peat	26/10/2003
48123	FRAINSLAKE SANDS	SR8880197885	PEAT	Peat	26/10/2003
48123	FRAINSLAKE SANDS	SR8885097900	PEAT	Peat and long timber	26/10/2003
48124	LYDSTEP HAVEN	SS0936098378	PEAT	Small frag of grey clay and timber	27/10/2003
48125	LYDSTEP HAVEN	SS0935798390	PEAT	S. end of long timber and clay	27/10/2003
48126	LYDSTEP HAVEN	SS0949798449	PEAT	Linear Peat deposit 1.5m wide	27/10/2003
48127	LYDSTEP HAVEN	SS0950898499	PEAT	Peat and clay northern most	27/10/2003
48128	LYDSTEP HAVEN	SS0935298430	PEAT	Large timber 3.5m long with an	17/09/2003
48129	LYDSTEP HAVEN	SS0933098401	PEAT	Small frag of peat 200mm above	27/09/2003
48117	ABER MAWR	SM8820834532	PEAT	Peat and timber	12/06/2003
48117	ABER MAWR	SM8822534554	PEAT	Peat and timber	12/06/2003
48117	ABER MAWR	SM8825034584	PEAT	Peat and timber	12/06/2003
48130	LYDSTEP HAVEN	SS0935298423	PEAT	Lump 3m x 2m and 0.15m high	27/09/2003
48131	FRESHWATER WEST	SM8798000678	FINDS	Flints Lewis 1992 132	16/03/2004
48132	FRAINSLAKE SANDS	SR8897697626	FINDS	Antler pick	26/10/2003
48133	WHITESANDS BAY	SM733270	FINDS	Lewis 1992 152 ref to finds	19/03/2004
48134	ABER MAWR	SM188203455	FINDS	Lewis 1992 170-2 by John Evans	19/03/2004
48135	ABER MAWR	SM8830034590	FINDS	Lewis 1992 177 three flints	19/03/2004

New sites 2004-2005

PRN	SITE NAME	NGR	Site type	Description	Visit Date
48136	AMROTH BEACH	SN1697306870	Wreck?	Large metal object at least 3m long, possible keel	13/11/2004
48137	AMROTH BEACH	SN161580673 SN1599106663	SUBMERGED FOREST	Patchy area of timbers, peat and clay. approximately 20m N-S and 200m E-W	13/11/2004
48138	WISEMAN'S BRIDGE	SN1481705946	SUBMERGED FOREST?	Two stumps or two timber posts at low tide point	13/11/2004
48139	WISEMAN'S BRIDGE	SN1467105770 SN1474705863	SUNKEN FOREST	Peat, timber and stump	11/03/2005
48140	WISEMAN'S BRIDGE	SN1472205981 SN1468105957 SN1460005974	SUBMERGED FOREST	Timbers and peat below pebbles, exposed by stream	11/03/2005
48141	LYDSTEP HAVEN	SS0934298400	SUBMERGED FOREST	Small patch of peat/clay. Possibly same as 48129	11/01/2005
48142	LYDSTEP HAVEN	SS0935598385	SUBMERGED FOREST	Wood and clay. could be the same as either 48124-5	11/01/2005
48143	LYDSTEP HAVEN	SS0935498412	SUBMERGED FOREST	Two patches of clay and timber just over 1m dia. Same as 48128 and 48130?	11/01/2005
48144	LYSTEP HAVEN	SS0935598436	SUBMERGED FOREST	Timber and clay. could be the same as 48128	11/01/2005
48145	LYDSTEP HAVEN	SS0935598445	SUBMERGED FOREST	Timber, clay and possible heat affected flint	11/01/2005
48146	LYDSTEP HAVEN	SS0937098480	SUBMERGED FOREST	Patches of clay also extending below sand in area c. 15m by 15m	11/01/2005
56075	LYDSTEP HAVEN	SS0947198513	SUBMERGED FOREST	Linear clay and peat c. 1.5m wide. Probably the same as 48127	11/01/2005
56076	LYDSTEP HAVEN	SS0945698492	SUBMERGED FOREST	Lumps of timber plus peat	11/01/2005
50684	FRAINSLAKE SANDS	SR8884497613	BURIED SOIL	West end of liner peat deposit, continuation of PRN 48120	18/09/2005
50684	FRAINSLAKE	188927197613	BURIED SOIL	Eastern end of	18/09/2005

	SAND			peat 2005. Same as 48120	
56077	GELLISWICK BAY	SM8884305630	SEA DEFENCE?	Short length of thin timber plank supported by small posts	21/09/2005
56078	GELLISWICK BAY	SM8883505614	BURIED SOIL	Clay, not peat below shingle	21/09/2005
56080	GELLISWICK BAY	SM8854505399	WRECK	Western of two adjacent wrecks, just visible on low tides	21/09/2005
56079	GELLISWICK BAY	SM1855405399	WRECK	Eastern of two adjacent wrecks, just visible on low tides	21/09/2005
56081	ABER MAWR	SN8820134600	SUBMERGED FOREST	Peat clay and timber extends c 35m to north	12/03/05
56082	ABER MAWR	SM8817834534	SUBMERGED FOREST	Patch of clay, peat and timber at base of pebbles	12/03/05
56083	NEWPORT	SN0606539531	BURIED SOIL	Peat below eroding salt marsh	12/03/05

Appendix 5 Radiocarbon Dates

CALIB REV4.4.2 Copyright 1986-2004 M Stuiver and PJ Reimer.

Lydstep
Radiocarbon Age BP 6150 +/- 120
Calibration data set: intcal98.14c (Stuiver et al., 1998a)

68.3 (1 sigma)	cal BC	5258- 5239	0.052
		5233- 5218	0.043
		5213- 4941	0.894
		4867- 4862	0.011
95.4 (2 sigma)	cal BC	5358- 5351	0.003
		5340- 5330	0.005
		5323- 4781	0.992

Freshwater West
Radiocarbon Age BP 5960 +/- 120
Calibration data set: intcal98.14c (Stuiver et al., 1998a)

68.3 (1 sigma)	cal BC	4998- 4707	0.977
		4702- 4692	0.023
95.4 (2 sigma)	cal BC	5209- 5165	0.028
		5144- 5108	0.019
		5101- 5089	0.005
		5083- 4543	0.948

St Brides

Radiocarbon Age BP 1000 +/- 70
Calibration data set: intcal98.14c (Stuiver et al., 1998a)

68.3 (1 sigma)	cal AD 980- 1067	0.608
	1082- 1125	0.259
	1137- 1157	0.134
95.4 (2 sigma)	cal AD 894- 925	0.058
	932- 1193	0.931
	1199- 1209	0.011

Whitesands

Radiocarbon Age BP 4540 +/- 70
Calibration data set: intcal98.14c (Stuiver et al., 1998a)

68.3 (1 sigma)	cal BC 3362- 3306	0.259
	3301- 3264	0.128
	3238- 3168	0.327
	3163- 3102	0.285
95.4 (2 sigma)	cal BC 3503- 3428	0.074
	3381- 3017	0.922
	2977- 2971	0.002
	2946- 2941	0.002

Aber Mawr: Lower Peat

Radiocarbon Age BP 7640 +/- 150
Calibration data set: intcal98.14c (Stuiver et al., 1998a)

68.3 (1 sigma)	cal BC 6645- 6375	0.876
	6361- 6345	0.032
	6311- 6297	0.028
	6292- 6262	0.065
95.4 (2 sigma)	cal BC 7028- 7015	0.004
	7012- 6967	0.014
	6949- 6932	0.006
	6916- 6881	0.013
	6831- 6206	0.951
	6188- 6181	0.002
	6171- 6162	0.003
	6132- 6110	0.007

Aber Mawr: Upper Peat

Radiocarbon Age BP 4500 +/- 60
Calibration data set: intcal98.14c (Stuiver et al., 1998a)

68.3 (1 sigma)	cal BC 3341- 3258	0.381
	3243- 3205	0.178
	3203- 3148	0.247
	3141- 3099	0.194
95.4 (2 sigma)	cal BC 3366- 3016	0.981
	2979- 2966	0.009
	2949- 2933	0.010

Pen-y-Bont

Radiocarbon Age BP 3650 +/- 80
Calibration data set: intcal98.14c (Stuiver et al., 1998a)

68.3 (1 sigma)	cal BC 2138- 1918	1.000
95.4 (2 sigma)	cal BC 2280- 2251	0.019
	2231- 2219	0.006
	2209- 1860	0.917
	1844- 1772	0.058

References for calibration datasets:
Stuiver, M., and Braziunas, T.F., (1993), The Holocene 3:289-305.
Stuiver, M., Reimer, P.J., and Braziunas, T.F., (1998b)
Radiocarbon 40:1127-1151. (revised dataset)
Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W., Burr, G.S.,
Hughen, K.A., Kromer, B., McCormac, F.G., v.d. Plicht, J., and
Spurk, M. (1998a), Radiocarbon 40:1041-1083.
McCormac, F.G., Reimer, P.J., Hogg, A.G., Higham, T.F.G., Baillie, M.G.L.,
Palmer, J., Stuiver, M., (2002), Radiocarbon 44: 641-651.

Appendix 6 Archive Catalogue

The project archive has been indexed and catalogued according to National Monument Record (NMR) categories and contains the following:

A. Copy of interim and final report

B. Records made during fieldwork, including context record sheets and site notebook.

D. Site photographs – digital only

M. Miscellaneous correspondence.

There is no material for classes C, E- L and N.

The archive is currently held by **Cambria** Field Operations, Llandeilo, Carmarthenshire, as project number 48116.

Figures

Photographs

Contents

Front cover: Newgale