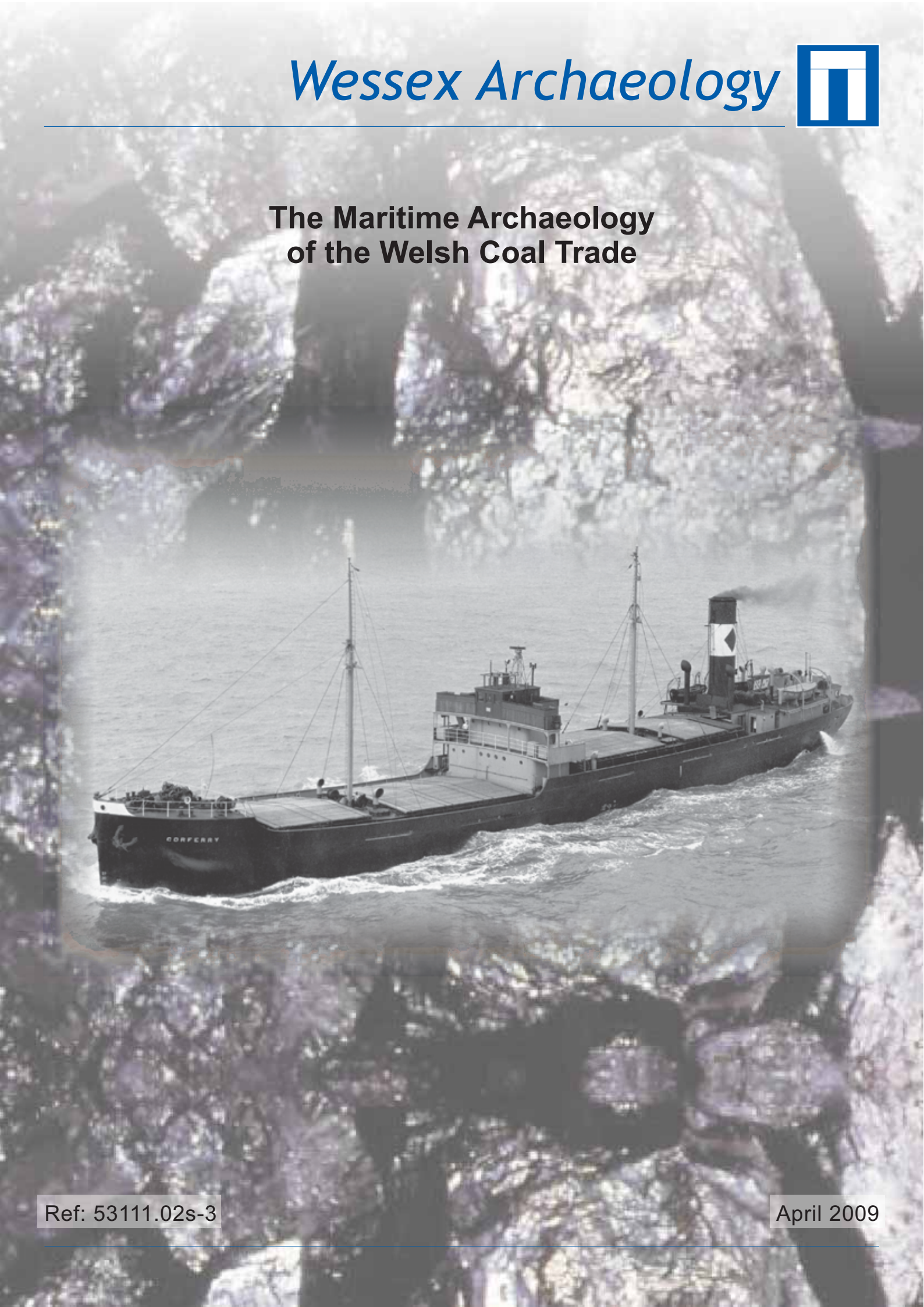
Wessex Archaeology

The Maritime Archaeology of the Welsh Coal Trade



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THE MARITIME ARCHAEOLOGY OF THE WELSH COAL TRADE

Prepared by:

Wessex Archaeology
Portway House
Old Sarum Park
Salisbury
Wiltshire
SP4 6EB

Prepared for:

CADW
Welsh Assembly Government
Plas Carew
Unit 5/7 Cefn Coed
Parc Nantgarw
Cardiff
CF15 7QQ

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Summary

"It is the great quantities of Bulksome Commodities that multiplies ships"
- Thomas Tryon, 1669

Wessex Archaeology was commissioned by CADW to undertake a thematic desk-based study of the maritime archaeology of the Welsh coal trade.

Although now in serious decline, the coal industry was fundamental in shaping the development of modern Wales, particularly in the south. For a brief period of time in the late 19th and early 20th centuries it was arguably also Britain's greatest single export and Welsh 'steam coal' powered the industrial and transport revolutions taking place across the world. The coal industry bestrode Wales like a behemoth. Most of the coal was exported and therefore the coal trade was by necessity largely a maritime trade.

Both South and North Wales had separate coal industries. The coalfields of North Wales were in the north-east. The South Wales coalfield extended across a wide area, from Abersychan in the east to St Bride's Bay in the west. The famous steam coal, ideal for use in steam engines, is found in parts of the South Wales coalfield.

The origin of these coalfields can be traced back to the medieval period. Output and coal exports grew slowly but steadily in the Post-medieval period, partly promoted by the development of iron smelting industry close to the collieries. However, it was not until the modern period that development of canal and then railway links between inland parts of the coalfields and the coast made trade in large quantities of coal economic. This coincided with a world of rapidly industrialising countries and created an explosion in demand for Welsh coal. This led to a huge rise in output and trade volumes and the building of massive coal ports to handle the large numbers of ships needed to transport the coal away to market.

The report provides a synthesis of available data concerning the history of the coal trade and of the coal ports and discusses by period the different types of vessel used to export coal.

Available primary and secondary sources have also been used to compile an archaeological audit of both known losses and known wrecks of vessels carrying Welsh coal within a loosely-drawn study area comprising UK territorial and near-territorial waters around the Welsh coast. A total of 592 known losses of coal carrying ships have been traced, of which 533 were carrying coal loaded in Welsh ports. The great majority were sailing vessels, although significant numbers of steamships were also lost from the second half of the 19th century onwards.

Searches of UKHO records and selective secondary sources have, by contrast, identified only 32 known wrecks of vessels carrying Welsh coal in a similar but slightly smaller study area. Available data concerning all of these wrecks has been compiled and discussed. Only four of the 32 wrecks are those of sailing vessels. None of the wrecks appear to have been subject to archaeological investigation and data concerning their current condition is fairly sparse.

This assessment is by necessity not a complete study but is in effect a scoping study. It is clear that the maritime archaeology of the coal trade has not received the research attention it deserves and has not produced the public benefits that it is capable of providing. The report therefore makes a number of recommendations for further related work.

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The report was compiled by Graham Scott, with contributions by Niall Callan, Kevin Stratford, Sue Nelson and Sue Davies. Kitty Brandon prepared the illustrations. Steve Webster edited the report and managed the project for Wessex Archaeology.

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THE MARITIME ARCHAEOLOGY OF THE WELSH COAL TRADE

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1. INTRODUCTION

1.1. ASSESSMENT BACKGROUND

1.1.1. This document has been prepared by Wessex Archaeology (WA) for CADW as part of a thematic assessment of the archaeology of the 'Welsh coal trade', defined for the purposes of the assessment as the movement to market by sea of coal mined in Wales.

1.1.2. The work was conducted as part of an agreed programme of works undertaken as part of the Contract for Archaeological Services in Relation to the Protection of Wrecks Act (1973) (PWA).

1.2. DOCUMENT PARAMETERS

1.2.1. The discussion is largely limited to the period up to the end of the Second World War in 1945, although later developments and events are briefly discussed, where relevant.

1.3. OBJECTIVES

1.3.1. The following objectives were set by CADW:

- present a synthesis of the historical development of the maritime coal trade of Wales;
- against this background, identify and undertake a desk-based scoping assessment of known maritime losses and wreck sites connected with the coal trade in UK territorial waters bordering Wales.

2. METHODOLOGY

2.1.1. The methodology and content of this assessment comply with the Institute for Archaeologists' Standard and Guidance for archaeological desk-based assessment (IfA 2008).

2.1.2. A detailed evaluation of the available primary evidence in the form of archaeological sites, artefacts in public and private collections, and documentary and photographic archives held at numerous institutions has not been undertaken. This would have been considerably beyond the resources available to the project and would have partly duplicated the work of a number of related studies. However an attempt has been made to examine the extent of these sources to determine how relevant they may be to further studies.

2.1.3. The section on known losses has been compiled through searches of the Royal Commission on the Historic and Ancient Monuments of Wales (RCAHMW) 'Coflein' database and relevant secondary sources (principally Larn 2000). Only

those vessels recorded as carrying coal as cargo or described as colliers have been recorded. During the assessment it became apparent that neither of the two sources traditionally relied upon by archaeologists (Coflein and Larn) were comprehensive and a small but significant number of additional known losses were added from other regional and local studies (for example Smith 1993).

2.1.4. The section on known wrecks was compiled by searching the UKHO wreck database. The UKHO was asked to supply details of any wrecks recorded as either carrying coal as cargo or described as colliers. Additional data for these sites has been added through assessment of selected primary and secondary sources, most notably Lloyd's Register, Reports of Inquiries into Wrecks ordered by the Board of Trade and Abstracts of the returns made to the Board of Trade of shipping casualties. Additional wreck sites have been added during the course of the secondary sources survey, where they have been noted to be carrying coal as cargo or described as colliers.

2.1.5. Only those wrecks positively identified as having loaded coal at Welsh ports have been included in Section 9 on known wrecks. The search results include a number of vessels whose port of loading is not specified or which loaded coal in a non-UK port. These have been listed in **Appendix II**, which includes the full search results as supplied by UKHO, enhanced using other sources.

2.1.6. The study area adopted for known losses is not limited to UK territorial waters bordering Wales. It was thought that such a limit would be arbitrary in the context of vessels ordinarily travelling well beyond those limits and might distort interpretation of the hazards faced by vessels engaged in the Welsh coal trade. Instead a study area was defined that included near territorial waters as shown in **Figure 1**. This more fully took into account approaches followed by colliers to Welsh ports, particularly those in South Wales. As can be seen from casual examination of that figure, limiting the study area to territorial waters would have produced a different interpretation of the distribution of losses.

2.1.7. The study area for known wrecks is also not limited to UK territorial waters bordering Wales, for similar reasons. However in order to keep the costs of data acquisition down, a slightly smaller study area has been used.

2.1.8. Data on known losses and wrecks was compiled using spreadsheets, which facilitated sorting and simple statistical analysis. The data has also been analysed geographically using GIS.

2.1.9. Whenever possible, dimensions and other vessel particulars have been obtained from the last edition of Lloyd's Register that the vessel is listed in. In that case they are listed in feet with metre conversions in brackets. If obtained from other sources they are given in metres.

2.1.10. The section on surviving vessels and hulks has been compiled using the National Register of Historic Vessels (NRHV), supplemented by additional information from secondary sources.

2.1.11. The period divisions used by the RCAHMW have been adopted for this analysis. However, in order to reflect the rapid evolution of merchant shipping in the 19th and

20th centuries, most notably the rise of the steamship after 1850, and the rise of the motor vessel and decline of sailing and steamships in the 20th century, the Modern period has been subdivided into: 1800-49; 1850-1913; and 1913-45. Vessel losses occurring after 1945 have been listed in **Appendix II** but are not otherwise included in the analysis and discussion.

2.1.12. References to miles in this report are to nautical miles except where stated.

3. THE COALFIELDS

3.1.1. Coal in significant quantities has been mined in two coalfields in Wales, the small North Wales Coalfield in North-East Wales and the giant South Wales Coalfield along the south coast.

3.2. THE SOUTH WALES COALFIELD

3.2.1. The South Wales Coalfield is an elongated oval area of carboniferous rocks extending approximately 90 miles from Abersychan in the east to St. Bride's Bay in the west (Figure 1). The width of the coal field varies from just two miles in the extreme west in Pembrokeshire, to about 20 miles in Glamorgan.

3.2.2. The coalfield lies in a basin-shaped depression. The coal-bearing strata generally dip from all sides towards the centre, except where synclinal and anticlinal faults and folds have disturbed this structure. Surface outcrops of coal measures therefore tend to occur towards the edges of the coalfield.

3.2.3. There are four main series of coal measures. Modern terminology classifies these as the Upper Pennant and Lower Pennant Measures and below this the Middle and Lower Coal Series.

3.2.4. It can be seen in **Figure 1** that only the western and central areas of the coalfield border the coastline. To the east the coalfield is some distance inland. Although the geological sequence is basin-shaped, the surface of the land in the central and eastern areas largely consists of a plateau penetrated by steep-sided river valleys.

3.2.5. The type of coal found within the basin varies depending upon the seam that it occurs in and the depth that it lies at. Generally speaking it follows Hilt's Law, in that the lower seams of a sequence at any particular locality are more anthracitic. However in the South Wales Coalfield an unusual phenomenon is seen, in that the coal occurring in a single seam varies in quality by becoming less bituminous and more anthracitic in northerly, north-westerly and westerly directions. As a result seams that are bituminous in Monmouthshire become almost purely anthracitic in West Glamorgan, Carmarthen and Pembrokeshire.

3.2.6. The South Wales Coalfield is famous for 'steam coal', a type of coal particularly suited to use in steam engines. A transitional coal between the slow-burning high carbon anthracites and the relatively fast-burning low carbon bituminous coals, it has a 91-93% carbon composition (Walters 1977: 4). Steam coal combined a high calorific power with the ability to generate heat quickly. It therefore enabled steam to be generated very rapidly. Its tendency not to swell meant that steam coal did not fuse into clinker in boiler furnaces and therefore allowed air to more efficiently

circulate to all parts of the fire. Furthermore steam coal did not produce much soot or smoke, or the fine ash that tended to clog boiler tubes (MacRea & Waine 1990: 9). Steam coal is not confined to the South Wales Coalfield, but it does occur there in huge quantities and drove the phenomenal rise in production there in the second half of the 19th century.

3.2.7. Steam coal is found in the greatest quantity and best quality in the central area of the coalfield from the River Taff to the Vale of Neath (**Figure 1**). West of this has traditionally been regarded as an anthracite area. Steam coal occurs in the Middle and Lower Coal Series and therefore generally at depth. In the eastern valleys the coal is predominantly bituminous and steam coal only occurs in the lowest measures.

3.3. THE NORTH WALES COALFIELD

3.3.1. The much smaller North Wales Coalfield lies in two distinct north and south sections separated by the Bala fault. The northern section is situated between the Clwydian range of hills and the estuary of the Dee. It extends roughly from the Point of Ayr in the north to Hawarden, a few miles west of Chester in the south. The separate southern section extends from Gresford in the north through Wrexham and beyond Oswestry to the south. These two north and south sections roughly correspond with former counties of Wales and are therefore often referred to as the Flintshire and Denbighshire coalfields.

3.3.2. The coal measures of the Denbighshire section are largely Middle Coal Series. They are deeply covered by later strata. Despite heavy fracturing there are few exposed seams and these occur in the west where the depth of cover is less. The coal measures of the Flintshire section are also heavily fractured and are exposed in places.

4. THE SOUTH WALES COAL TRADE

4.1. PRE-MEDIEVAL (TO 1066 AD)

4.1.1. Evidence of coal burning has been found in Roman villas in Ely, Gelligaer and Llantwit Major (Hatcher 1993: 137). No evidence of a maritime coal trade appears to exist.

4.2. MEDIEVAL PERIOD (1066-1540)

4.2.1. The abbey of Margam leased the right to mine coal on the land of Owen ab Alaythur at Penhydd near Margam in 1250. This included a right of way for two and four-wheeled carts (Glamorgan County History, ii: 301-4). In 1324 records exist for the existence of a colliery at Saundersfoot in Pembrokeshire in 1324 (http://www.wales-underground.org.uk/pit/geology.shtml).

4.2.2. Development of mining in the Medieval period relied largely on the availability of easily won surface outcrops of coal. A concentration of pits therefore developed around Neath, Swansea and Port Talbot, as well as in Pembrokeshire. Sporadic activity also occurred near Abergavenny and north of Cardiff and in the extreme north-west of the Glamorgan part of the coalfield. There is some evidence however for the working of seams some distance from the surface, for example at Kilvey near

Swansea (Hatcher 1993: 138). Records exist of an output of 5000 tons at Cilfai (Kilvey?) near Tenby in 1399 (Hatcher 1993: 137).

4.2.3. Although the colliery at Kilvey appears to have been exceptionally large for the period, producing perhaps 5-6,000 tons a year (Hatcher 1993: 138), contemporary records of rents paid for pits suggest that the typical enterprise in the South Wales Coalfield was modest rather than significant in size (Lewis 1903: 146-7). The estimated total output of coal produced for sale in South Wales in 1560 is 15,000 tons (Hatcher 1993: 68).

4.2.4. The coasting and export trades appear to have been very small in scale prior to the 17th century. Despite records existing of noteworthy production in the Tawe Valley before 1340, the earliest records of its shipment is in 1500 when a load was taken to Tenby from Swansea (Lloyd Gruffydd 2000: 38). Of the many ports in Glamorgan and Pembrokeshire, customs accounts indicate that only Swansea shipped more than 1,000 tons per annum prior to 1600 (Hatcher 1993: 138). Although the possibility exists that these figures are skewed by widespread tax evasion, it appears that most coal was consumed locally and that the scale of production was geared principally towards small-scale domestic consumption.

4.2.5. There is evidence for coal being exported to Ireland from Milford during this period (Woodward 1989: 36). The reciprocal trade that existed between Bridgwater and Wexford, with coal being carried to Wexford in return for fish (DeCourcy Ireland) may have had parallels on the north side of the Bristol Channel. Coal is recorded as being amongst cargoes handled by small ports associated with the castles of Tenby, Haverfordwest and Pembroke (Geraint Jenkins 2006: 15).

4.3. POST-MEDIEVAL PERIOD (1540-1799)

4.3.1. Growth and development can be identified in the South Wales Coalfield in the early 17th century before the Civil War of the 1640s. However the market remained local and largely domestic and it appears that coal had to a significant extent replaced wood as the principal domestic fuel, particularly in the towns. When John Leland visited Pembrokeshire in the late 1530s his description suggests that the principal use of coal was as a substitute for wood in domestic fires. It is clear from George Owen's account of his travels in the same county published in 1603 that coal was still used principally for domestic purposes (Hatcher 1993: 138-9). Indeed the high level of domestic consumption is evidenced by Owen's comment that 'generally the country people dislike with the selling of the commodity (for export), least in time it grow so scarce that the country shall want it, being the greatest fuel' (Hatcher 1993: 139).

4.3.2. Notwithstanding this lack of an export market, the development of collieries appears to have undergone a steady expansion as a result of the demands of the local domestic market. Considerable sums seem to have been invested in mining by the local gentry and others, and pits are commonly recorded as being dug as deep as 120 feet in Pembrokeshire. This expansion is particularly notable in east Glamorgan and Monmouthshire.

4.3.3. Although coastwise and export shipments of coal did increase during the early 17th century, the scale remained small. As late as the 1640s the combined trade of Swansea, Llanelli, Burry, Neath, Milford and Tenby rarely exceeded 20,000 tons and

virtually no coal was shipped from either Cardiff or Carmarthen (Hatcher 1993: 138).

4.3.4. This changed in the late 17th century when there was a much more substantial surge in output led by seasales, both coastwise and overseas. Records are too scarce and trade appears to have been too volatile to allow a precise picture to be built up, but Hatcher has suggested that shipments of coal probably increased fifteen-fold in the first 75 years of the 17th century, rising from 5,000 to 75,000 tons or more per year (Hatcher 1993: 140). Principal overseas markets appear to have been in Ireland and the Channel Islands.

4.3.5. Coastal trade was predominantly south or south-westwards, to the nearby ports of Bridgwater, Minehead, Ilfracombe and Barnstaple for distribution inland and around the Cornish peninsula to Falmouth, Exeter and Plymouth. The different coal ports appear to have focussed on different market ports. For example most of the coal shipped through Milford went to Barnstaple, Bideford, Ilfacombe and their creeks or, because of its advantageous position on the edge of the Bristol Channel, to ports along the south coast of Cornwall and Devon. Tenby, on the other hand, shipped coal mainly towards Somerset and very little was shipped to Devon (Hussey 2000: 32). Bristol, the most important regional settlement, rarely featured in shipments, largely because of its own nearby supplies.

4.3.6. A very small amount of coal found its way to London and even around to Yarmouth on the east coast. However Welsh coal was unable to compete on cost with coal from the north-east and did not make serious inroads on the London market, despite the high quality of Pembrokeshire anthracite (Hatcher 1993: 140). In 1706 the best foreign markets for Welsh coal were said to have been Brittany, Normandy and south as far as Bordeaux (Hatcher 1993: 141).

4.3.7. Swansea and Milford became the leading coal ports, regularly shipping 20,000 tons or more. Neath and Llanelli shipped 10-15,000 tons each, whereas even the small port of Tenby grew from handling a few hundred tons to more than 7,000 (Hatcher 1993: 140).

4.3.8. Research undertaken by Hussey has shown that there were strong seasonal and geographic influences upon the coal trade during the 17th and 18th centuries (Hussey 2000: 50-51). Seasale was dependent upon transport to the port and access to shipping, and peaked in the optimum summer months for coastal sailing ships.

4.3.9. The expansion of seasales did not last and trade at most ports appears to have peaked before the mid-1680s. The reasons for this are complex, but competition from other coal-producing areas, wars with Holland and France and sharply increased duties all appear to have had a significant impact. According to Sir Humphrey Mackworth in 1695 the coal trade of Neath 'had been almost completely lost' and both the trade and industry of Llanelli appears to have been in recession. The recession of the 1690s appears to have cut production in the South Wales Coalfield by as much as one-third (Hatcher 1993: 141).

4.3.10. During the first half of the 18th century, coal output appears to have grown steadily. Flinn estimates that in 1700 the total coal output from South Wales was about 80,000 tons and that by 1750 it had grown to about 140,000 tons (Flinn 1984: 26). In the late

17th century the coastal port books of both Swansea and Neath appear to have been little more than tabular accounts of coal exports (Hussey 2000: 56). Swansea shipped over 46,000 tons coastwise in the period 1700-05 (Hussey 2000:57).

4.3.11. The second half of the century saw a more dramatic surge in output, with production rising to 1,700,000 tons by 1800. Production from the western and central sections of the coalfield, including the area around Swansea, dominated until about 1775 and then fell rapidly behind the eastern section which was responsible for about 70% of output by 1800 (Flinn 1984: 27). From approximately 2.7% of national output in 1700, the South Wales Coalfield was producing 11.3% in 1800 (Flinn 1984: 26).

4.4. MODERN (1800-PRESENT)

4.4.1. In the 19th century and the first years of the 20th century the South Wales coal industry was transformed by the rapid industrialisation of not only Britain but also large parts of the developed and developing world. This process depended upon the steam engine and steam engines needed a plentiful supply of suitable coal. This not only created a huge demand for Welsh steam coal but also provided the means by which coal could be brought economically to the coast for shipment from areas of the coalfield that had not previously been accessible.

4.4.2. The export of coal from the South Wales Coalfield had always suffered from the difficulties and therefore high costs of moving the coal overland from the mines to the coast. However, in the 1790s the era of canal building reached Wales. Canals were built linking existing ports on the South Wales coast with coal-producing areas in the Welsh valleys. The Glamorgan Canal between Cardiff and Merthyr Tydfil was opened in 1794 and was linked to new dock facilities at Cardiff in 1798. In 1798 the Monmouth Canal was opened linking the coalfields with the port of Newport. Although principally built to serve the iron industry, these canals also offered a cost-effective means of moving coal from the collieries to markets along their length and also to the coast for export.

4.4.3. However by 1830 the coal trade remained much as it was in the 18th century, restricted almost entirely to the coastwise trade, serving ports along the Bristol Channel, principally Bristol, and along the south-west coast, together with Irish ports to the south of Dublin.

4.4.4. In 1816 parliamentary papers reveal that 126,000 tons of coal was exported to Ireland, a market share of 20.6% (Flinn 1984: 223). In 1814, 465 vessels carrying coal sailed from Cardiff to Ireland, 383 from Llanelli and 376 from Swansea (Flinn 1984: 223). This represented about 20% of all the coal-carrying voyages from British ports to Ireland in that year.

4.4.5. Rather than the coal trade, in the first half of the 19th century industrial production in South Wales was instead dominated by its large iron industry. This industry, which by 1810 counted 25 furnaces in Glamorgan alone, absorbed much of the production of the South Wales collieries and formed their principal market.

4.4.6. However, this was to change. Beginning in the 1830s there was a growing realisation that the coal, particularly the steam coal, had particular qualities that gave it great appeal to wider markets. This coal seems to have been first exploited near Merthyr

in 1824 and first sent to Cardiff for export to London in the same year (Bird 1963: 220). However, it was not until the 1830s that determined efforts were made to break into the London market, the greatest home market, which had hitherto been dominated by the coalfields of the north-east of England. Although this achieved some success (interest in the smokeless steam coal was stimulated by the London Smoke Act) coal from South Wales still represented only 5% of London consumption in 1855 (Macrae and Waine, 1990: 67).

4.4.7. Although the first successful operation of a steam locomotive hauling a load on rails famously occurred in Merthyr in 1804, it was more than thirty years before railways gained a significant foothold in Wales. Although the development of the canals had undoubtedly contributed significantly to the expansion of coal mining and of the general industrialisation of the coalfields, they suffered from problems including heavy lockage caused by the steep terrain and capacity issues. Railways offered the potential to move coal in greater quantity at lower cost and more quickly. Therefore once the advantages of rail transportation were fully appreciated, railway lines connecting the collieries with the coast were rapidly and intensively built during the 19th century, with some major valley routes eventually having two or even three parallel routes along them (www.rcahmw.gov.uk). The forerunner and arguably the most important was Brunel's Taff Vale Railway of 1836 which subsequently enabled Cardiff to become the most important coal exporting port.

4.4.8. Although it had been the canals that first allowed coal from the interior to be moved to the coast for export in large quantities, it was not until the arrival of the railways that the means existed by which truly enormous quantities of coal could be exported. This in turn stimulated the rapid development of many more collieries and the development of port facilities to handle the coal. The availability of coal from the eastern part of the coalfield also meant that the focus of exports shifted to the ports of south-east Wales, such as Cardiff and Newport, and it was there that the most dramatic expansion in dock provision occurred.

4.4.9. The 19th century saw the rapid expansion of worldwide trade. The second half of the century also saw the worldwide rise to domination of the steamship. It was quickly realised by steamship owners that South Wales steam coal was an ideal fuel for their vessels. This received official backing in 1851 when an Admiralty report concluded that South Wales steam coal was the most suitable coal for Royal Navy ships.

4.4.10. This period also saw an even greater expansion in the worldwide demand for coal for railways and for the industrial application of steam engines. The same qualities that made steam coal excellent for steam engines also made it ideal for railway engines and for the steam engines used in industry.

4.4.11. As a result the coal trade started to expand dramatically in the 1840s. By 1850 the coal trade had overtaken iron as the most important industry in Wales and expanded so rapidly that by the eve of the First World War it represented in terms of tonnage a large proportion of Britain's export trade.

4.4.12. In 1855 87% of the 8,550,270 ton total coal output of South Wales was retained in the UK. 13% was exported abroad, representing some 23.4% of total UK exports (Mitchell & Deane 1971: 120-121). Approximately 21% of the retained output was exported coastwise to other regions. The remainder was used within the South Wales

region for the metallurgical, gas and domestic markets. Approximately 29.4% of this was used in the chief industry of the region, the manufacture of iron (Walters 1977: 316-7). An unknown proportion was exported as bunker coal by the growing number of steamships operating from the ports of South Wales.

4.4.13. By 1885 output had almost tripled to 24,342,856 tons, but the proportion retained in the UK had shrunk to approximately 60%, with 40% being exported internationally. Of the retained coal the same proportion of approximately 21% was exported coastwise. The balance was used within the region, although the proportion used by the iron industry had shrunk to 10.6%, reflecting a relative stagnation in the production of iron and advances in fuel economy related to its manufacture (Walters 1977: 316-7).

4.4.14. By 1913 output had more than doubled again to 56,830,072 tons, a rise in output of more than 650% in less than 60 years. The proportion retained in the UK had fallen to just 47.6%, the proportion of coal exported internationally having passed 50% of total output by 1905 (Walters 1977: 316-7). This represented 40.6% of total UK exports (Mitchell & Deane 1962: 120-121). Of the coal retained in the UK, the proportion exported coastwise outside of South Wales fell to 12.6%, reflecting the growing demand within the region in the industrial and domestic sectors of the market. In addition just less than 20% of the retained coal was exported as bunker coal. Use in iron manufacture fell to just 6%.

4.4.15. Welsh steam coal established an early worldwide dominance in the 1850s and 1860s due to its quality and the lack of alternative supplies of suitable coal. However, once large-scale mining of suitable coal began in Japan, India, Australia and North America, Welsh exporters lost this advantage. Thereafter for general commercial purposes the continued existence of an export market for Welsh steam coal was determined by the cost per unit of evaporative power. If Welsh coal was more expensive than coal from other sources then its market share tended to decline to negligible proportions. In those markets Welsh coal was usually limited to naval and fast passenger and mail liner use.

4.4.16. Some of the coal sent coastwise went to Ireland, where it was used by Irish railways and by the domestic and industrial market there. It also went to a number of English ports such as London and Liverpool for use as bunker coal. Additionally it went by rail to London, Liverpool, and Southampton and to ports serving the Admiralty as bunker coal.

4.4.17. Between 1857 and 1914 France and the Mediterranean was the oldest and largest export regional market for Welsh steam coal and it was this market that led the trade's expansion. By the 1870s it was consuming 70% of the steam coal exported (Walters 1977: 320). Welsh steam coal was able to maintain its dominance in this, its most important market, because it had no serious rival, even German coal making little serious impact.

4.4.18. France was by some way the most important part of this market, taking almost half of the total, with Spain, Italy and Turkey also significant. During the course of this period France's relative importance declined slightly, but Italy and Egypt became more significant. In the case of the former this was due to its industrialisation. In the

case of the latter it was due to the opening of the Suez Canal. Entrepot ports within the region were also significant importers.

4.4.19. Railway companies in France and the Mediterranean bought Welsh coal almost without exception during this period. Other important customers were shipping companies and coal merchants based in Western and North West France and at Genoa. The British Admiralty and private British depots in Malta, Gibraltar and Egyptian ports also sought Welsh coal in large quantities.

4.4.20. Export to India and the Far East was considerable, principally for railway and steam navigation purposes. However the development of first Indian and then other coalfields (most notably those of the Japanese) meant that foreign coal was much closer to hand and therefore more economic. Whereas in the 1850s 8-10% of Welsh coal exports had been to the Orient, by the mid-late 1880s the market for Welsh coal had started to contract. By 1914 these markets were largely lost and only navies and liners took Welsh coal beyond Suez.

4.4.21. The African market was initially strong, with 8.7% of Welsh coal being exported to the continent in 1857. Most of this coal supplied bunkering facilities on the Cape sea route, with some railway consumption in the south. The rise of the Natal coal industry resulted in the loss of most of the Southern African market. However most of the rest of the continent continued to derive its coal largely from South Wales.

4.4.22. The North American and West Indies market was initially of considerable importance. In the period 1857 to 1868 it accounted for 8-15% of output. However competition from the Pennsylvania coalfield after the American Civil War of the 1860s resulted in a contraction of the market for Welsh coal to well under 5%. This competition from cheaper American coal even resulted in fast transatlantic passenger ships out of the UK taking return bunkers of American coal instead of relying upon a large bunker of Welsh coal for both outward and return passages (Thomas, 1903: 59). By 1914 competition was such that this market accounted for only 0.3% of the total output of South Wales (Walters 1977: Appendix 11b).

4.4.23. The South American trade remained a notable success throughout the period from 1857 to 1914. Initially accounting for 9.1% of output in 1857, trade grew until in 1914 it accounted for over 17%. The vast majority of this coal was exported to countries bordering the east coast of South America, as the western seaboard markets were eventually lost to competition from Canadian and Australian coalfields (Walters 1977: Appendix 11b). In the 1920s Welsh coal constituted the largest proportion of British exports to South America (Willson Lloyd 1922: 22). The chief demand was for bunkers and for the railways. Coal was frequently taken out as ballast, the ships returning to the UK with grain and nitrates.

4.4.24. Although the Baltic and North Sea ports were not as significant to Welsh exporters as they were to those in the north-east of England, in the 1850s and 1860s this market accounted for up to 8.0% of the output of South Wales. However, this market contracted to about 3% of output in the 1880s due to German competition, before recovering to between 6-7% at the turn of the century (Walters 1977: 326). Railways were the principal customers.

4.4.25. Although Britain's foreign trade doubled in both bulk and value in the period 1850-1914, colliers usually required homeward cargoes in order to trade profitably. Fortunately the expanding industry and population of Victorian and Edwardian Britain created a demand for a wide variety of imported raw materials and foodstuffs which the colliers were able to carry. As a result homeward trades were developed in iron ore from northern Spain, pitwood from France and Scandinavia and grain from the countries bordering the Black Sea and South America. The development of improved port facilities resulted in faster turnaround times, which in turn promoted this homeward trade (Jenkins 1997: 3).

4.4.26. The homeward cargoes could also be taken to other European destinations. The surviving papers relating to the large sailing vessel N.B. Lewis provide a good example of this. Employed in 1886 for shipping a cargo of wheat from San Francisco to Dunkirk, the vessel was next chartered in 1887 to transport coal from Cardiff to South Africa (Stammers 2000: 83-89).

4.4.27. Not all ships carrying coal outbound were exclusively devoted to the trade. Many vessel owners employed their ships in a variety of trades depending upon demand and the location of their vessels when business came in. Coal might form an important part of their trade but other outbound bulk goods would be carried.

4.4.28. Coal exports from the UK declined steeply during the First World War, largely due to increased domestic demand for war industries. In the early 1920s there was a very rapid and short-lived surge, with total UK coal exports briefly exceeding the 1913 high point. Thereafter exports declined dramatically and by the onset of the Second World War coal exports were little more than half the 1913 total.

4.4.29. This UK decline was mirrored in South Wales with the coalfield losing 241 collieries in the inter-war period. The decline was precipitated by a move to oil fuel by shipping companies and increasing overseas competition, together with a deep and worldwide recession. In addition the terms of the Treaty of Versailles at the end of the First World War required Germany to make reparations to the allies in coal. This had the unintended effect in the immediate post-war years of flooding Europe with cheap coal and thereby making it much harder for Welsh coal to compete in what had been its chief market.

5. HISTORY OF THE NORTH WALES COAL TRADE

5.1. PRE-MEDIEVAL (TO 1066 AD)

5.1.1. The heavy fracturing and faulting of the seams of the North Wales Coalfield resulted in suitable seams being exposed in many places. This appears to have resulted in an early start to mining, with some evidence that coal was exploited during the Roman period (Hatcher 1993: 129).

5.2. MEDIEVAL PERIOD (1066-1540)

5.2.1. It has been suggested that coal mining as an organised industrial activity was first undertaken in north-east Wales on behalf of the monks of Basingwerk Abbey, founded in 1157. Coal is known to have been used at this time for metal smelting and manufacture and for lime making.

5.2.2. Considerable activity appears to have taken place in the late 13th century in the northern, coastal part of the coalfield alongside or close to the Dee, taking advantage of the proximity to cheap water transport. This appears to have been spurred by English military activity in north Wales, most notably the demand created by Edward I's massive castle and associated settlement building programme in 1277-1330 (Lloyd Gruffyd 2000: 38). In 1277 the workers employed in the construction of Flint Castle included a group of coal miners (www.fflint.co.uk/industry.html).

5.2.3. The coal was needed by Edward to enable large quantities of iron to be smelted and to burn the lime used to make mortar and plaster and wash. Surviving contemporary accounts for the castles indicate that over 500 tons of coal was transported to Conway in 1283 and 2,500 tons to Beaumaris in 1295, both of these totals being achieved in a period of only about 5 months (Hatcher 1993: 131). Transport would have been by sea and it is known that a fleet of 30 boats was based at 'Holston' on the estuary of the Dee to enable coal and stone produced by collieries and quarries nearby to be transported to Beaumaris (Colvin 1963: 349 and 399).

5.2.4. This intensive maritime activity appears to have been the product of short-lived demand. The general demand for coal appears to have been significantly lower during the later Medieval period. Chester appears to have provided a market and there are references in the Chamberlain's Accounts of coal being brought by water along the Dee from 1326-7 and possibly earlier. However the absence of any reference to coal in Chester customs accounts or of its importation into any other North Wales port suggests that no significant coastal trade in coal existed in the region during this period (Hatcher 1993: 132). There does not appear to have been any longer distance trade.

5.3. POST-MEDIEVAL PERIOD (1540-1799)

5.3.1. The North Wales coalfield appears to have gradually expanded during the 16th century. Although shipments of coal from Chester rose by 400-500% in the second half of the century, the total amount exported in 1602-3 was still less than 1,000 tons (Hatcher 1993: 132). This expansion therefore does not appear to have been on any great scale. Nevertheless the presence of London merchants within the ranks of colliery owners suggests that the coalfield was of growing importance. It may be inferred from this that coastal trade in coal was also growing.

5.3.2. In the early 17th century there appears to have been a much more significant expansion in activity. Records exist for the colliery at Mostyn on the Dee estuary which show an output of 7,000-10,000 tons by 1619. It is possible that at the time this colliery was the most important on the western seaboard of Britain. Indeed coal exported from Chester (and its satellite ports) tended to be described in the city's Port Books as 'Mostyn coal' (Hatcher 1993: 133).

5.3.3. Despite this activity total output seems unlikely to have exceeded a few thousand tons before the mid-16th century. By 1700 output greater than 50,000 tons probably only occurred in very exceptional years (Hatcher 1993: 135). The output of collieries in the southern part of the coalfield appears to have amounted to about one-third of this total.

5.3.4. By the 1630s, export shipments from Chester ports had reached 4,000 tons and by the end of the century they had grown to approximately 8,000 tons. Exports from Liverpool, probably consisting largely of Flintshire coal, presumably moved to Liverpool by sea, also increased. From about 750 tons per year in the first quarter of the century, exports from Liverpool grew to about 2,000 tons in the 1630s and 3,000-3,500 tons in the 1660s. Whilst this trade was fairly modest, the coastwise trade appears to have been very scant. Shipments from Chester ports rarely exceeded 1,500 tons per annum before 1690 and coastal shipments from Liverpool appear to have been even lower (Hatcher 1993: 133).

5.3.5. There is some evidence to suggest that proximity to the sea and therefore to waterborne transport was an important factor in determining the growth of collieries. A survey conducted in 1594 concluded that the coal mines at Ewloe had been in decline 'because of the great store in other places most convenient to the sea, where they are digging with less charge' (Hatcher 1993: 133). However a special commission held at Mostyn in 1616 was told that landsales from the colliery were four times as great as seasales (Hatcher 1993: 134).

5.3.6. Whilst this testimony was given in the context of an investigation into customs fraud and may therefore be inaccurate, other evidence suggests that markets served by seaborne transport were not the principal markets served by the North Wales coalfield during the 17th century. This is particularly true of the southern part of the coalfield, although the total absence of inland water communications does appear to have restricted growth. Although there were no large centres of population within carting distance, local demand for coal grew significantly during this period due to the increasing industrial use of coal in lead smelting, brick making and pottery manufacture.

5.3.7. Furthermore the export trade came under considerable pressure during the later 17th century. The coalfield was too remote from continental markets and although coal exported to Ireland had about half the rapidly expanding Dublin market, by 1685, it had largely lost this share to the Cumbrian collieries. Changes in the navigability of the Dee seem to have halted this trade in 1699 (www.fflint.co.uk/industry.html). A similar dip occurred in the already modest coastal trade, as competition from South Wales resulted in the coalfield losing market share in the South West.

5.4. MODERN (1800-PRESENT)

5.4.1. By 1816 the North Wales coalfield was exporting 26,000 tons of coal to Ireland per annum, a 4.2% share of the market (Flinn 1984: 223). In 1814 some 226 vessels sailed from Chester to Irish ports carrying coal, of which 201 were bound for Dublin (Flinn 1984: 224).

5.4.2. During the later 19th century the coal trade of North Wales was rapidly eclipsed in scale by that of South Wales. The last major mine to open was Llay Main Colliery in the early 1920s. However, the late 20th century saw a decline in production, which eventually ceased in 1996 with the closure of the Point of Ayr Colliery.

6. THE COAL PORTS

6.1. SOUTH WALES

6.1.1. The following assessments for North and South Wales have been limited to ports in Wales itself whicht handled coal from either the North or South Wales Coalfields. As a result some ports that have handled significant quantities of Welsh coal, such as Chester and Liverpool, have been omitted.

Newport

6.1.2. Newport owes its existence to its position at the mouth of the River Usk. Scattered prehistoric and Roman finds are known from the area and it is very probable that the Romans used the Usk to reach their fort at Caerleon. However, although archaeological and other evidence suggests the possible presence of a trading post by the 10th century (GGAT 2004: 18), it seems unlikely that there was any substantial settlement there before the end of the 11th century.

6.1.3. Newport had a significant port in the Medieval period. However it was not important enough to be a customs port and therefore information on its early maritime history is scarce. The Bristol Channel is subject to a great tidal range. The Medieval port would therefore have been tidal and vessels would have been required to take the ground on mud berths between tides. Vessel traffic seems to have centred on a large inlet known as the 'Town Pill' and the castle dock. By the 15th century the town was served by a small town quay.

6.1.4. Vessels were also able to access landing sites up to four miles upstream at Caerleon. Newport could handle vessels of considerable size, as is shown by the recent discovery of the 15th century 'Newport ship' (GGAT 2004: 23). However despite the existence of a substantial ship-owning community, there appears to be no evidence of an outbound coal trade at this time. Instead fleeces and processed cloth seem to have been the main outbound commodities, with coal being imported for iron working (Griffiths, 1978).

6.1.5. In comparison to Swansea and Llanelli, Newport is relatively remote from the South Wales Coalfield (Figure 1). The navigable stretch of the Usk did not reach as far as the Coalfield and the distance and terrain made overland transport economically unattractive. As a result no serious consideration seems to have been given to shipping coal through the port until the late 18th century. As late as 1775 a customs officer based in the area stated (Geraint Jenkins 2006: 121):

'No coal can ever be raised in this part in order to be shipped for exportation or to be carried coastwise; its distance from the water rendering it too expensive for such sales.'

6.1.6. However within a generation the situation was radically different. The Monmouthshire and Brecon Canal was opened in stages between 1796 and 1799. The canal linked the wharves at Newport with Pontnewynydd above Pontypool and Crumlin. Although this canal was intended primarily to support the iron trade, it also provided a means whereby collieries in the valleys of the eastern section of the Coalfield could be profitably exported. Despite this the coal trade through Newport was initially slow to develop because of the demands of the thriving Glamorgan iron

industry. Less than 7,000 tons of coal was shipped through Newport in 1797 (Geraint Jenkins 2006: 121).

6.1.7. However, aided by the building of extensive tramways linking the collieries to the canal, and an 1818 Pillgwenlly extension of the canal in Newport to link it with river wharves to the south of the old town, by 1833 a total of 386,845 tons of coal were shipped through Newport, more than two and half times that shipped through Swansea. Of this less than 1% was for export, the rest going coastwise to UK destinations. Coal moved through Newport to ports east of the Holm islands (including Bristol) had the great advantage of being duty free until coastwise duties in the UK were generally repealed in 1831 (Bird 1963: 227). Despite this loss of advantage, Newport had become the principal port of the South Wales coal trade. This was aided by the completion of its railway links in the 1850s. As elsewhere these links largely superseded the canals in terms of the transport of coal and enabled far larger quantities of coal and related materials such as imported pit props to be moved.

6.1.8. The mid-1840s saw a dramatic increase in foreign trade as well as total shipments, with about a quarter of the total of 6633,430 tons going abroad. In 1880 foreign exports exceeded the coastwise trade for the first time and in the following year total shipments exceeded 2,000,000 tons for the first time (Walters 1977: Appendix 12). Between 1880 and 1884 the average net tonnage of vessels clearing for and entering from foreign ports totalled 1,040,000 and 749,000 tons respectively, some 3.3% and 2.5% of the national totals.

6.1.9. Coal exports were initially from wharves on the west bank of the Usk. The canal was extended to the south in 1806 to facilitate the extension of these wharves and dry docks were built in 1830, extended in 1842 and again in 1888 (GGAT 2004: 24). However, the increased shipments, as well as the demands of the iron trade and the new tin-plate industry, created pressure to improve the facilities and capacity of the port.

6.1.10. Ships using Newport were experiencing the same problems of congestion, and unsuitable mud berths as were being experienced at Swansea. What was needed was a floating dock. First mooted in the early 19th century, the first floating dock, the 4.5 acre Town Dock, was eventually opened in 1842 close to the exit of the Monmouthshire Canal. The dock featured a lock that was claimed to be the largest in the world at the time, able to accommodate the largest ships then afloat (GGAT 2004: 127).

6.1.11. This dock was extended in 1858, but this was not adequate to meet demand that was now fuelled by the rapid development of railway transport between the Coalfield and Newport. The problem became acute but it was not until the 1870s that further major expansion occurred. Space for this expansion was created by reclaiming tidal mud flats further to the south. The 28.5 acre Alexandra Dock (later known as the North Dock) opened in 1875 and was followed by the 20 acre South Dock in 1892 (Bird says 1893).

6.1.12. Even this could not keep up with demand and a 48 acre South Dock extension was opened in 1907, followed by a further 28 acre extension of the Alexandra dock complex in 1914. This final expansion provided Newport with a co-ordinated docks

system able to handle both coal and general cargo. It featured the longest example of a simple lineage quay in South Wales (1091m) and a new 305m entrance lock which was claimed to be the largest in the world at the time (Bird 1963: 227 and http://www.opac.newport.gov.uk/opac/newportnotes /alexandradock/index.htm).

6.1.13. In the same year total coal shipments from Newport were almost 5.5 million tons, of which 75% was exported. Coal was far and away the most important commodity handled by the docks. Between 1910 and 1913 the average annual net tonnage of vessels clearing for and entering from foreign ports was 2405 and 1908 tons respectively, very slightly increasing Newport's share of the national total. Nevertheless by this time the coal trade of Newport was dwarfed by that of Cardiff, which was handling over 20 million tons per annum.

6.1.14. As with the other ports serving the South Wales Coalfield, the coal trade through Newport was affected by the worldwide economic turmoil during the 1920s and 1930s and by the increasing use of oil as a fuel and gradually declined. The Town Dock, which was obsolete by the 1930s, was closed and filled in.

6.1.15. However it was not until the second half of the 20th century, after the Second World War, that the coal trade through Newport went into serious and then terminal decline. The coal loading equipment at the port, which had at its height totalled 14 tips, was dismantled and moved to other ports or scrapped (MacRae & Waine 1990: 68). By 1960 coal had ceased to be a significant export (Bird 1963: 228) and in 1964 all coal shipping at Newport stopped as the decision was taken to concentrate the trade at Barry and Swansea. Trade recommenced in 1981 and the port now handles some inbound coal and coke shipments, with facilities for coal washing, screening and blending.

Cardiff

6.1.16. Cardiff owes its existence to its position on the lowest bridging point of the River Taff, about a mile from the sea. This river gives it a geographical advantage over other South Wales coal ports in that it is the 'master stream' of the central part of the coalfield. The whole of the river valley system of the Taff and its tributaries could thus be reached by canals, tramways and finally railways connected to Cardiff. Cardiff also has the advantage of having its approach sheltered from prevailing winds by the promontory of Penarth Head.

6.1.17. There is limited evidence for prehistoric activity in Cardiff. A Roman fort was built there in AD 55/60-75 on the east bank of the Taff. A succession of forts was built there, with the last being vacated around AD 383. Small scale industrial activity has been found, suggesting the presence of a civilian settlement (GGAT 2004: 26). No evidence of maritime activity appears to have been found, although a small harbour may have existed to supply the fort and civilian settlement.

6.1.18. Little evidence exists for the presence of a substantial settlement before the 1080s, although a monastery was founded at Llandaff in around 680 (GGAT 2004: 26) and Norse place name evidence has been used to suggest the presence of a trading post.

6.1.19. The Romans were not the only invaders to spot the strategic potential of Cardiff and a Norman castle was built there in the late 11th century. Thereafter a substantial walled town developed around the castle. The pace of development was sufficient to

mean that the town had outgrown its defensive wall by 1171. By 1262 the population is estimated to have reached about 2000 (Rees 1969: 28).

6.1.20. Maritime trade grew during the 13th century and was closely linked with the port of Bristol. It is likely that a river quay was in existence by then, as evidenced by the name 'Quay Street', now well away from the river (Bird 1963: 218). Despite the setbacks of the Black Death and Glyndwr's attack in 1404, trade continued to develop in the 14th and early 15th centuries, although coal does not seem to have been a significant import or export. Although the civil wars of the late 15th century caused considerable economic disruption, contemporary records suggest that Cardiff vessels continued to sail to Bristol (Chappell 1939: 17).

6.1.21. Despite a decline in the population, Cardiff remained a significant port in the 16th century, with both coasting and foreign trade. In 1559 Cardiff became the Head or Legal Port for all of the ports and creeks between Chepstow and Worms Head (Lewis 1927: ix). The earliest reference to a quay is dated 1550 (GGAT 2004: 30).

6.1.22. In the 1780s a local customs official is reported to have ventured the opinion that Cardiff would never develop as a coal exporting port (Jenkins 1997: 1). However the 19th century saw a staggering growth, transforming Cardiff from a modest port to possibly the foremost coal exporting port in the world.

6.1.23. The initial stimulus came from iron, not coal. The development of the iron industry inland at centres like Merthyr Tydfil in the mid-18th century meant that there was a need to ship the iron that they produced to its markets, both at home and abroad. However Merthyr was about 24 miles from the sea. A road was built from Merthyr to Cardiff in 1767 allowing carts to replace pack-horses. It was improved as a turnpike in about 1780. However, carts were slow and expensive and the Taff, like all tidal ports in the eastern part of the Bristol Channel, is subject to very big tidal range. The facilities at the Town Quay could therefore only be reached by small vessels at high water.

6.1.24. As a result it became economic to build canals and associated tramways linking these centres with ports on the coast. Just as Newport had been linked with an iron-producing hinterland by the Monmouthshire and Brecon Canal, Cardiff was linked to the iron centre of Merthyr by the Glamorganshire Canal. Navigable in 1792, the 25 mile canal was completed in 1794 and connected to the River Taff just below Cardiff. The East and West Canal Wharves were built (Bird 1963: 220) at the canal-side. The canal barges could carry 25 tons, whereas the largest wagons could only manage about two tons.

6.1.25. In 1798 the Sea Lock Pound (a floating basin and sea lock) was built at the lower end of the canal (Paget-Tomlinson 1993: 135). This enabled the trans-shipment of cargo from the canal barges to larger sea-going vessels. However sea-going vessels still had a winding two mile approach along the lower reaches of the river in order to reach the Pound and this route was more or less dry for three hours each tide. As a result only those vessels of 200 tons or less could enter the dock (Bird 1963: 218).

6.1.26. Despite this the existence of the canal had the effect of increasing traffic to a level well beyond that which it could cope with. The Pound was also much too small for the level of demand and this together with the limits imposed by the tidal Taff meant

that long delays were experienced in exporting goods through the port. The extension of the canal to Aberdare in 1812 made a bad situation intolerable. Between 1820 and 1839 the amount of goods passing through the port increased from 50,000 to 350,000 tons and the Board of Trade reported that not only was the size of ship limited to 200 tons, but that many vessels could be held up 6-8 days whilst waiting to get in or out. Larger vessels had to wait outside the port and be loaded by lighter.

6.1.27. In the 1820s John, second Marquess of Bute and the major landowner in the area, commissioned plans to build a new floating dock. However it was not until 1839 that his floating 'Bute Ship Canal' (later to become the Bute West Dock) was opened on the East Moors alluvium, south-east of the town and adjacent to the canal (Jenkins 1997: 1; Bird 1963: 218). At the time at 19.5 acres it was the largest in Wales (Geraint Jenkins 2006: 126).

6.1.28. The opening of the canal created the means by which coal could be moved from inland collieries to Cardiff. Although this did not result immediately in the development of a significant outbound coal trade, by the 1830s market conditions, including the passing of the London Smoke Act, resulted in large quantities moving through the new dock. The opening of the Taff Vale Railway in 1841 facilitated the rapid transport of coal from the Cynon Valley (Jenkins 1997: 1). As a result Cardiff rose quickly from being the fourth most important coal port in Wales in 1840 to the most important in 1851 (Jackson 1983: 88). Coal shipments rose during this period from 165,923 to 740,385 tons (Walters 1977: Appendix 12). By then coal was truly the dominant cargo handled by Cardiff, having eclipsed iron. Of over 900,000 tons of cargo handled by the Bute West Dock in 1850 (Geraint Jenkins 2006: 127), over 725,000 tons was outbound coal (Walters 1977: Appendix 12).

6.1.29. Initially almost all of the coal trade was coastwise. Much went to Bristol, with smaller amounts going to Ireland and West Country ports. However, exports grew and in 1854 exports exceeded coastwise trade for the first time. Thereafter and until the First World War most of the coal shipped through Cardiff went abroad.

6.1.30. Although the building of railway links greatly increased the amount of coal that could be moved to Cardiff, they resulted once again in chronic congestion. Proposals for a second dock to alleviate the congestion were drawn up in 1847 but the second Marquess died in 1848 and it was not until 1859 that the new 46 acre Bute East Dock was fully opened. This dock was the first to be designed from the outset to link with the growing railway network that linked Cardiff with the collieries and reflected the growing dominance of rail as a means of getting coal to the port. However the growing demand for facilities was insatiable and the new dock was already inadequate by the time it was completed. Outbound shipments of coal had already exceeded 1 million tons by 1854 (Walters 1977: Appendix 12). Indeed the Board of Trade reported in 1855 that (Geraint Jenkins 2006: 128):

'Oft times, 200 or 300 vessels were anchored in Penarth Roads, either on steam waiting their turn to come into the dock or hoping for a fair wind to proceed on their outward voyage.'

6.1.31. This demand resulted in the development of ports at Penarth one and a quarter miles south-west of Bute West Dock on the opposite bank of the Taff. This in effect provided overflow facilities. In 1874 another new dock, the 13 acre Roath Basin, was

opened and in 1887 a further very large dock, the 33 acre Roath Dock, came into use (**Plate 1**). This was not enough to satisfy demand and to silence the complaints of Cardiff's critics who considered it to be tardy in its response to the demand. When in the 1880s the congestion reached crisis proportions, colliery interests in the Rhondda went ahead instead with their own railway and dock at Barry to the west (Jackson 1983: 128).

6.1.32. However, even this was not the end of the development of the port which was not completed until 1907 when the Queen Alexandra Dock was built on 320 acres of reclaimed land. Cardiff's eminence at that time was acknowledged by Edward VII, who said of the port as he opened the Queen Alexandra Dock that 'In the shipping trade of my Kingdom, Cardiff holds an important place.'

6.1.33. Coal shipments through Cardiff exceeded 10 million tons per annum for the first time in 1889. The high point of 1913 saw the staggering total of 24,244,293 tons shipped from Cardiff, Barry and Penarth, of which 15,587,100 tons was exported (Walters 1977: Appendix 12). On a typical day, 1 June 1904, there were 150 ships in Cardiff docks, most of them loading coal, and a large number waiting to enter.

6.1.34. From the late 19th century an increasingly large proportion of coal sent to Cardiff was for bunkers. By 1913 bunkering accounted for almost 14% of the coal shipped (Walters 1977: Appendix 12).

6.1.35. Although Cardiff ship-owning got off to a slow start, by 1875 there were 122 Cardiff-owned ships amounting to 57,115 gross tonnage. By 1910 this had increased to 253 ships of 716,803 total gross tons (Jenkins 1997: Appendix 5).

6.1.36. After the First World War there was a short lived boom in shipping using Cardiff. In 1920 122 shipping companies had offices there and there were 272 Cardiff-owned ships. A total of 4,448,000 tons of foreign-going shipping arrived in comparison with 7,617,000 in 1913 (Jackson 1983: 167). However, the move to fuel oil and the availability of cheap German coal discussed above meant that the boom was short-lived. By 1932 in the middle of the worldwide Depression, coal exports had fallen to below 5 million tonnes and much locally-owned shipping was laid up.

6.1.37. The trade of the port of Cardiff did not recover from this. Despite a period of intense activity during the Second World War coal exports continued to decline. By 1960 exports had shrunk to 373,000 tons (Bird 1963: 221). Between 1938 and 1960 Cardiff's share of the total coal exports of South Wales also shrank from 27% (about 5,282,000 tons) to 24%. They finally ceased in 1964, by which time the Cardiff-owned fleet had shrunk to 24 vessels. As a result much of the port has been redeveloped for other uses and only two docks, the Roath and Queen Alexandra, remain in use.

Barry

6.1.38. Evidence of Prehistoric and Roman occupation has been found at Barry, 8 miles west of Cardiff. Barry Island, separated from the mainland by a tidal estuary, may have been used as a raiding base by the Norse in 1087 (Dowell 1971: 10-11) and was described in the Giraldus Cambrensis (Gerald of Wales 1191).

6.1.39. Although a castle was built before the 13th century and a small port developed, Barry appears to have been a small village settlement during the Medieval and Post-Medieval periods and early modern period. Even by 1871 the population was still not much more than 100.

6.1.40. There appears to be no evidence that coal was exported from Barry throughout this time, although limestone was exported from the tidal harbour and it was also used as a harbour of refuge. The settlement seems to have been predominantly agricultural.

6.1.41. In the 1880s this changed dramatically. Dissatisfied by severe congestion on the Taff Valley Railway and at the port it served, Cardiff, in the 1870s and by the high rates charged at that port (partly to finance the construction of new docks), a group of coal merchants and colliery owners headed by Lord Davies formed the Barry Dock and Railway Company and in 1883 sought permission to build a dock at Barry and a new railway to connect it to the coalfields in the Rhondda.

6.1.42. Determined opposition by Cardiff interests headed by the Bute family delayed the project but the necessary Act of Parliament was eventually forced through and work commenced on the new docks in 1884. In 1889 the first cargo of coal was shipped from the new and very large 73 acre No.1 Dock. Linked by rail to the Rhondda colliers, within six months over 1,000,000 tons of coal had passed through Barry (Jenkins 1997: 11).

6.1.43. The site chosen for the new port was in the lee (north-east) of Barry Island. No. 1 Dock sealed off the lagoon between Barry Island and the shore and was the only completely irregularly shaped deep dock in Britain. It was wider than it might otherwise have been, to ensure that it could have foundations on solid ground. No.2 Dock was opened in 1898, increasing the total acreage to 107. The site had the advantage of a shorter approach from deep water than Cardiff, although it had a very slightly longer rail haul from the collieries and was less well placed for dealing with imports.

6.1.44. Barry was able to outstrip the relatively slowly developing facilities at Cardiff and by 1913 Barry was the largest coal exporting port in the world (Jackson 1983: 129-130), with 41 coal tips (**Plate 2**) and 56 cranes and a reputation for being able to unload colliers faster than anywhere else in Wales. Between 1889 and 1913 coal exports through Barry grew from about 1 million tons to 11.75 million tons (Geraint Jenkins 2006: 149). Despite this Barry, along with Penarth, has always been treated as an outport of Cardiff.

6.1.45. Like other ports, Barry suffered a contraction in the coal trade in the inter-war years and in the aftermath of the Second World War. Between 1938 and 1960, Barry's coal exports shrank from about 5,673,000 tons to 633,000 tons. This represented a decline from 29% to 24% of South Wales' total exports of coal, as against Cardiff's decline from 27% to 20% (Bird 1963: 223). However in 1963 Barry was the beneficiary of a decision taken to concentrate the remaining exports of coal from the south-east ports at a single port. Nevertheless coal exports through the port ceased in 1977.

Penarth

6.1.46. The port of Penarth was developed in the 1850s to provide relief from the chronic congestion experienced at Cardiff. Prior to this Penarth was a small settlement.

6.1.47. It was chosen for a number of reasons. Firstly it was close to Cardiff. Secondly, the land was not owned by the Marquess of Bute whose interests were contradictory and lay in the development of Cardiff. Thirdly it had a waterfront location around the natural harbour formed by the River Ely. Fourthly and very importantly the expansion of the railway network enabled coal to be transported to Penarth, which had no canal link. It held an advantage over Cardiff in that it was closer to the deep waters of the Bristol Channel.

6.1.48. The first stage, the Ely Tidal Harbour, was completed in 1859 and the Penarth Dock in 1865. Both were backed by the Taff Vale Railway which linked them to the Rhondda coalfields.

6.1.49. Penarth was in its heyday in the early years of the 20th century. However with the increasing size of colliers it was found that the 28 acre docks were increasingly too small and too shallow. The great depression during the inter-war years resulted in the weakened port being closed to commercial traffic in 1936, although a coal loading wharf on the River Ely continued in use and could handle colliers of up to 800 tons. This was despite a 6-9m tidal range that meant that the vessels used mud berths (MacRae and Waine 1990: 69). Penarth Docks themselves were reopened as a result of war requirements in 1940 but finally closed in 1963 (Jenkins 1997: 67).

Porthcawl

6.1.50. There appears to be no evidence for the export of coal from Porthcawl prior to the 19th century. However, in the early 18th century an ambitious scheme was drawn up to export coal and iron from the Maesteg and Ton-du areas. The place chosen, a natural harbour at Newton, near Porthcawl Point, was different from other South Wales harbours in that it was not on a river mouth. In 1825 permission was obtained to build the port and a horse-drawn tramway connecting it with Dyffryn Llynfi and by 1828 the new port had opened.

6.1.51. The port, which did not have a floating dock, was not initially a great success. It was deepened in 1832. However, it was not until the 1840s that the expansion of iron making and coal production in the area led to considerable further investment in improving the port. This investment was increased in 1854 when the Great Western Railway took over the port. By 1865 it was connected to the coalfields by a steam railway and by 1867 two docks (a 21 acre tidal basin and 71 acre floating dock) were open near Coney Beach (Geraint Jenkins 2006: 152). Although the narrow locks limited the size of vessel to large coasters and the port was in an exposed position, moderate quantities of coal were shipped from the port in the late 18th and early years of the 19th century. In 1888 for example over 340,000 tons were exported coastwise (MacRae and Waine 1990: 69).

6.1.52. However the port eventually succumbed to the competition of the larger and rapidly developing ports of Barry and Port Talbot to the east and west respectively. Sources consulted differ but the port appears to have closed in closed 1906 (Geraint Jenkins 2006: 152), after falling into effective disuse by 1902 (http://www.visitporthcawl.co.uk /history/history.htm).

Port Talbot

6.1.53. Port Talbot grew out of the small medieval port and market town of Aberafan (Aberavon) on the River Avon.

6.1.54. Coal from the collieries near Margam Abbey may have been shipped from Aberafan and the nearby Baglan in the Medieval and Post-Medieval periods. It is likely that vessels would have been loaded from tidal wharves along the Afan (Geraint Jenkins 2006: 153).

6.1.55. Pack horses were initially used to transport coal to the coast near Llewellyn's Quay. This was replaced by a tramway in 1757 and subsequently by a railway. Iron was first imported in 1811 and copper in 1839 (Bird 1963: 214).

6.1.56. It was not until 1837 that a floating dock was built from a lagoon associated with the Avon, although this was principally to serve the strong local copper interests (Jackson 1993: 88-89). No further significant development occurred until 1894 when the Port Talbot Railway and Docks Company was formed and a new floating dock was built to accommodate ocean-going vessels was opened in 1898. Good railway links with many of the major colliery areas, in particular Llynfi and Garw, and the improvement of the docks resulted in a considerable expansion in the volume of coal shipped. By 1910-13, Port Talbot was loading 1.4% of the net tonnage clearing UK ports for foreign parts (Jackson 1993: 139).

6.1.57. Port Talbot seems to have benefitted from the mixed nature of the nearby industrial economy and seems to have weathered the slow decline of the coal trade in the inter-war years. Iron ore and chemicals became significant 20th century imports. By 1960 coal amounted to only 3% of the value of exports from the port (Bird 1963: 217). In 1970 a huge floating dock called the Tidal Harbour was constructed to serve the steelworks at Margam, although the use of the other older docks had by then become very limited.

Neath and Briton Ferry

6.1.58. Neath is situated on the strategically important lowest bridge crossing of the River Neath. As such both Roman and Norman military fortifications were built there and the Medieval settlement was also a trading port. It is likely that vessels used mud berths on the river.

6.1.59. Coal mining is known to have occurred in the locality from the early 16th century and a copper smelting industry was established to exploit it by 1584. It is not known to what extent coal was exported but it is likely that the overwhelming use of local supplies was for copper smelting.

6.1.60. The completion of the Neath and Tenant Canals in 1795 and 1824 and then the completion of railway links in 1850-1 allowed coal to be supplied in much greater quantities from a much wider area, resulting in the further industrialisation of the area and enabling coal to be exported in significant quantities.

6.1.61. Briton Ferry lies between Port Talbot and Swansea and is the lowest ferry crossing. The growth of trade in the Neath area and the congestion it caused on the River Neath created the need for a dock to handle steel and tin-plate exports. This was designed by Brunel and constructed at Briton Ferry in the 1850s. It consisted of a tidal basin and a floating dock.

6.1.62. The dock was unsuitable for vessels drawing more than 16 feet and was therefore mainly used by coasters rather than ocean-going vessels. Shipments of coal from the

dock became significant in the late 19th century, with 176,000 tons being shipped coastwise in 1888 (MacRae and Waine 1990: 70). Shipments continued into the 20th century with most going to the Channel Islands and Bristol Channel ports such as Bristol. Although trade declined, by 1930 there was still the need for a hydraulic coal tip. In the late 20th century coal was actually imported (Geraint Jenkins 2006: 154). The port remains open, although at a much reduced level of traffic.

Llanelli, Burry and Penarth

6.1.63. On either side of the neck of the Gower peninsula the coalfield borders the sea and heavy faulting results in the presence of high quality anthracite on and close to the surface. Despite the presence of easily-won coal there appears to be a complete lack of documentary evidence for Medieval coal mining in the Llanelli area (Hatcher 1993: 137).

6.1.64. It is not until the Post-Medieval period that evidence exists for a coal trade through Llanelli. Leland had noted the digging of coal at Llanelli when he passed through the area between 1536 and 1539 and modest quantities were shipped through the town during the 1630s and 1640s. During the 17th century there is some evidence that the region around Neath and Llanelli was becoming the most significant part of the coalfield (Hatcher 1993: 139).

6.1.65. During the 18th and 19th centuries the development of the port at Llanelli was spurred on by the rapid growth of the tin-plate industry in its hinterland. Despite difficult access caused by shifting sandbanks in the approach to the port, which limited the size of vessel that could access it, a series of floating docks was built in the early 19th century and these were then added to in the early 20th. Carmarthenshire Dock was built in about 1801, Pemberton's Dock in around 1805, Copperworks Dock in 1806 and North Dock in 1903 (Geraint Jenkins 2006: 161).

6.1.66. Although the focus of the port was very much the tin-plate industry, there were significant coal loading facilities in the North Dock and the Great Western Railway Dock. In addition there were tidal coal stages that could handle vessels up to 3000 tons (MacRae and Waine 1990: 70).

6.1.67. The demise of the tin-plate industry resulted in the severe decline of the port. The docks eventually closed in 1951.

6.1.68. To the west of Llanelli was Burry Port, opened in 1832. By the mid-19th century Burry Port together with Pembrey together handled the export output of the Gwantdraeth Valley coalfield, which had formerly been loaded from beaches. As a result of the building of a local railway network and the growth of the tin-plate industry the docks were expanded in 1888 (Geraint Jenkins 2006: 162). Burry Port and Pembrey were disadvantaged by the same difficult access that limited the size of ships that could get into Llanelli.

Swansea

6.1.69. There is little evidence for the presence of a port at Swansea prior to the Medieval period. There is some evidence for both a Romano-British or Roman and a Scandinavian presence at Swansea and the site, at the mouth of the River Tawe, may well have been used as a trading harbour during the Early Medieval period (GGAT 2004: 40).

6.1.70. Swansea had a strategic location following the Norman invasion of Wales. It is probable that some form of quay was built on the west bank of the Tawe by Henry I's vassal Henry de Newburgh, Earl of Warwick in the early 12th century. This facility would have supplied the new castle that guarded the river crossing (Williams 190: 3). Subsequently Swansea became the *de facto* headquarters of the Norman rulers of the region and grew into a trading settlement of some significance and privilege.

6.1.71. The significance of the port is attested by the right conferred upon the citizens of the town in a charter of 1306 to build four 'great ships' each year and an unlimited number of boats (Williams 1990: 8). Although contemporary sources are limited, both Williams and Boorman have suggested that the trade of the port was similar to that of Carmarthen and Milford, with strong trading links with ports of the Severn and south-west England and limited trade with Ireland and French ports such as La Rochelle, Bordeaux and Bayonne (Boorman 1990: 57). During Edward's Welsh wars of the late 13th century Swansea was sufficiently important to be used as a maritime supply base and a trading voyage carrying a mixed cargo including coal was undertaken to Ireland in 1447 (GGAT 2004: 43).

6.1.72. Borough papers from 1583 refer to the existence of 'the perroge by the pill…nowe called newe Key place'. The pill appears to have been a small creek off the Tawe (Bird 1963: 207).

6.1.73. As noted above, a number of collieries appear to have been active in the Swansea area. It appears to have been the only South Wales port exporting more than 1,000 tons per annum prior to 1600. The Welsh Port Books indicate that in the late 16th century major markets for coal exported through Swansea included France and the Channel Islands. Between 1566-67 and 1602-3 these sources indicate that coal accounted for almost all of the port's out-shipments.

6.1.74. Although the town supported a modest population both in the town and in its hinterland, coal and copper were the driving forces behind the development of the port in the Post-Medieval period. Coal came first. As discussed above, most of the early collieries were developed where they could exploit the proximity of the sea and therefore waterborne transport. On this western edge of the South Wales Coalfield, Swansea had an established enclosed harbour at the mouth of a navigable river (unusual for South Wales), a bay which provided safe anchorage for waiting vessels, and with a number of important collieries in its immediate hinterland. It was therefore well placed to exploit the coal trade and was able to develop an early pre-eminence.

6.1.75. The smelting of non-ferrous ores, principally copper, also drove the development of the port in the Post-Medieval period. Approximately eighteen tons of coal was needed for the production of one ton of copper (Williams 1990: 24). As a result, the ready availability of this coal close to the coast in the Lower Swansea Valley and around Neath meant that it was more economic to bring the copper ore produced in Cornwall to South Wales for smelting rather than *vice versa*.

6.1.76. Copper smelting began at Neath in the 1580s and at Landore on the River Tawe in 1717 (Carter 1957: 205-6), exploiting the accessibility of the river at that point to vessels of up to 60 tons and the availability of alternative ore supplies from Ireland

and Anglesey (Boorman 1990: 58). The eventual scale of this copper industry in the 19th century led to Swansea acquiring the nickname 'Copperopolis'.

6.1.77. This period saw the rapid development of quays and the building of a graving dock. A significant shipbuilding industry seems to have been present since the 12th century and by 1652 it had been noticed that the increased boom in this industry was adversely affecting vessel traffic in the port (Williams 1990: 16).

6.1.78. The town corporation reacted to navigational problems that threatened to act as a deterrent to further growth by increasing regulation of shipping using the harbour and river to prevent ballast accumulating and by the construction of quays in the 16th and 17th centuries (Boorman 1990: 59). However, navigational problems continued to plague the port, notably a bar at the mouth of the river. Although the River Tawe was navigable for two miles upstream by small vessels of up to 60 tons, it was becoming an economic necessity that ports should be accessible to much larger vessels. Although measures to improve the harbour were the subject of much heated debate in the 17th century, little further was done. Despite this Daniel Defoe was able to write in the early 18th century that:

'The chief sea port is Swanzey, a very considerable town for trade, and has a very good harbour. Here is also a very great trade for coals and culm, which they export to all the ports of Sommerset, Devon, and to Cornwall, and also to Ireland itself; so that one sometimes sees a hundred sail of ships at a time loading coals here; which greatly enriches the country, and particularly the town of Swanzey.'

6.1.79. Much of the trade of Swansea seems to have been carried out by vessels from Devon, Ireland, the Channel Islands and from further afield. Nevertheless local ship-owning grew during this period and by 1709 the total tonnage of coasting vessels belonging to the port was 2,148 tons (Boorman 1990: 58).

6.1.80. Swansea was slow to adapt to the changing demands of the coal and non-ferrous trades in the 18th and 19th centuries. Although the opening of the Swansea Canal in the Tawe Valley in 1798 and the Tennant Canal to the Vale of Neath in 1824 had greatly improved transport links to Swansea's hinterland, the port facilities were increasingly inadequate. A floating dock was increasingly needed to avoid the hazardous requirement for large loaded vessels to take the ground at low water. The port lagged behind its competitors and it was not until the 1850s that Swansea gained this facility, with the opening of the floating North and South Docks on the western side of the Tawe. These had a quay frontage of 10,000 feet traversed by a dock railway directly connected to the national rail network (Boorman 1990: 66). Navigation for the port was greatly improved by the New Cut of 1845. This diverted the Tawe, whose former course was then impounded to create the North Dock.

6.1.81. By the 1870s these docks were insufficient to meet the increasing demand, particularly from coal, which still provided the greater part of business in the middle of the 19th century. Coal shipments, which had reached 152,784 tons in 1833, continued to expand from 245,071 in 1850 to 732,493 in 1870. Thereafter they continued to rise steeply, reaching 937,457 tons in 1880 (Walters 1977: Appendix 12). The proportion of the total annual shipment going to foreign as opposed to coastwise UK ports during this period rose dramatically from 8.5% in 1833 to 73.5% in 1880 (Walters 1977: Appendix 12).

6.1.82. Swansea was reputed to be the most overcrowded harbour in Britain (Boorman 1990: 67). Whereas 3,616 vessels with a total tonnage of 269,545 had cleared from Swansea in 1851, by 1879 5,745 vessels cleared with a tonnage of 761,708 (Boorman 1990: 67). Furthermore the vessels of the 1870s were increasingly steamships, whose registered tonnage was well below their gross tonnage and the weight of cargo carried.

6.1.83. Eventually a new dock on reclaimed land on the east side of the river, the Prince of Wales Dock, was opened to shipping in 1882. This marked a shift in port development from the historic port on the west side of the Tawe. However, even this was not enough and was therefore followed by the extension of the Prince of Wales Dock to 28 acres in 1898 and the 70 acre King's Dock in 1909 (Jackson 1983: 130 and GGAT 2004: 44).

6.1.84. During the age of sail Swansea was relatively important as a ship-owning port. In 1877 there were 25 individuals or companies with 2,000 or more tons of shipping in the port. However 1876 appears to have represented a high water mark and with the increasing dominance of the steamship came a decline in ship-owning. By 1914 the largest steamship owners in the port had only 11,483 tons, whereas ten Cardiff owners had 23,000 tons or more.

6.1.85. Trade continued to expand in the late 19th century and the early years of the 20th century, driven by the export of coal and the non-ferrous metal smelting industry, which now included tin-plating. The movement of goods was predominantly outwards. Imports trebled in the period 1862-1913, whereas exports increased seven-fold. Although Swansea lost its pre-eminence in the export of coal, it still exported considerable quantities. Between 1890 and 1913 annual coal shipments increased from 1,238,018 to 4,499,867 tons (Walters 1977: Appendix 12). Swansea dominated the export of anthracite coal, with 1,761,687 out of a total of 1,999,687 tons produced in the South Wales Coalfield passing through the port in 1909 (Boorman 1990: 74). Patent fuel was also important, with shipments rising from 99,000 tons in 1855 to 925,000 in 1913 (Boorman 1990: 74).

6.1.86. Given the rise in the volume of shipments to foreign ports, it is not surprising that Swansea also gained an increasing national share of the vessels clearing for or entering from foreign ports. Whereas in 1880-4 foreign-going shipping with an average net tonnage of 777,000 and 567,000 per annum had cleared and entered Swansea respectively (2.5% and 1.9% of the national total respectively) by 1910-3 these figures had risen to 2487 and 1868 net tons (3.4% and 2.5% respectively) (Jackson 1983: 139).

6.1.87. Coal was not the only commodity associated with the coal trade. As with other coal ports, the collieries created a huge demand for pitwood, chiefly for pit props. Local supplies had been exhausted by the 19th century and considerable quantities were therefore imported from France and other countries through Swansea. Similarly ships carrying coal outbound would tend to return with another commodity if they could rather than in ballast. In the case of Swansea this was often copper ore or at a later date regulus, supplied by many different mines in Northern and Southern Europe, South Africa, Australia, and North and South America.

6.1.88. Exports of all commodities through Swansea peaked in 1913, when coastwise and overseas exports exceeded six million tons for the first time. The coal trade was severely disrupted during the First World War, the beginning of which marked the start of a long decline in the port's fortunes. By 1914 imports and exports had fallen to their lowest level since 1904 (Boorman 1990: 75).

6.1.89. However, the coal trade continued to dominate the trade of Swansea in the inter-war years. During peak years it accounted for four-fifths of tonnage shipped out through the port. Trade fluctuated in the 1920s, largely due to events outside of the port's control, for example the US coal strike in 1923, which resulted in an increase in shipments, and the General Strike of 1926, which not only resulted in fewer shipments but also the loss of some markets (Boorman 1990: 77). The 1930s saw a general increase in exports, with coal being shipped to France, Italy and Canada.

6.1.90. Post-1945 coal exports through Swansea declined. It was a gradual process and in 1960 coal was still the second most valuable export from the port, although it had only one-fifth the value of tin-plate exports (Bird 1963: 214). Much volume was diverted to Barry as a result of changes in the nationalized industry's export strategy. Outward oil shipments became much more significant, with 38 million tons between 1962 and 1971 as against 13 million tons of coal and coke during the same period. By 1980 the port was no longer exporting more than a million tons per annum and by 1984 this had fallen to 177,000 tons (Boorman 1990: 84). Coal shipments through Swansea ceased in 1987 when the remaining coal hoists were dismantled (Humphrys 1990: 341).

Milford Haven

6.1.91. The 30km long Milford Haven is one of the finest deep water natural harbours in the world. Its natural advantages for maritime trade appear to have been appreciated from as early as the Bronze Age period. Subsequently it has been used for both military and trade purposes. The Vikings over-wintered there and it was the muster point for the Anglo-Norman fleet that invaded Ireland as well as a landing place for Owain Glydwr and Henry Tudor. Later it was a packet port and was used by the 18th century British fleet. In the 20th century it was a vital base in the Battle of the Atlantic. Two major medieval port towns, Haverfordwest and Pembroke, grew up on the shores of the Haven.

6.1.92. As discussed above, documentary evidence exists of local coal mining and export (notably to Ireland) from Pembrokeshire during the medieval and early post-medieval periods. Surface outcrops of coal cross the Upper Haven.

6.1.93. Exports seem to have been fairly small in scale and it appears that the main use of local coal was local and largely domestic, although its use in the iron industry appears to have grown. However by 1700 local coal was the major export from the Haven and indeed from Pembrokeshire as a whole.

6.1.94. Coal was shipped from a number of small quays and wharves built along the waterway. As the trade grew in the 18th and 19th centuries these facilities proliferated and small informal harbours such as Little Milford were developed into busy coal exporting ports. New quays were established or expanded at Hook, Little Hook, Landshipping Quay and Ferry, Cresswell, and Sprinkle.

6.1.95. These ports and harbours tended to be built where it was geographically convenient for the colliery, to avoid having to transport the coal far overland to existing ports or more suitable locations for shipping. This therefore tended to be in the upper reaches of the Haven. As a result they could only be reached by small barge. This resulted in the building of wharves and port facilities further down the Haven, such as at Lawrenny Quay. There the coal could be loaded onto larger vessels for the coastwise or export trades.

6.1.96. The coal trade of the Haven reached its peak in the 19th century. In the 20th century the trade declined and many of the coal wharves in the upper reaches were abandoned. In 1947 following nationalisation the coalfields of Pembrokeshire were declared uneconomic and were shut down. The coal trade out of the Haven therefore ceased.

6.2. NORTH WALES

6.2.1. A large number of small ports have existed along the North Wales coast and may have handled shipments of coal. However, only those for which evidence of coal shipments has been encountered during this limited study have been included.

Flint

6.2.2. Flint lies on the west bank of the estuary of the River Dee.

6.2.3. Two quays are known to have existed at Flint during the Medieval period, one serving the castle and the other the associated town. A Post-Medieval quay was built at the mouth of the River Swinchard and was associated with local lead and then chemical works (www.cpat.org.uk/projects/longer/ports/ports.htm). This was only accessible at high water to small vessels and was subject to the hazards of navigating the rapidly changing channels of the Dee

6.2.4. There were collieries in the vicinity of Flint and surplus production over local requirements resulted in an export trade. Flint had a thriving coal trade with Ireland until the late 17th century when competition and changes in the navigation of the Dee greatly reduced the trade. In 1832, 570 of 683 vessels departing Flint were loaded with coal. During the same year only 74 vessels cleared the port bound for Dublin (www.fflint.co.uk/industry.html). Average tonnage for the vessels involved in both trades appears to have been only about 60 tons.

6.2.5. Although early 20th century Flint was a busy port, by the mid-18th century much traffic that might otherwise have used Flint bypassed it in favour of Mostyn and Connah's Quay (Geraint Jenkins 2006: 283). In 1905, 8,429 tons of cargo was handled. Coal from local collieries was one of the main commodities handled. It is likely that part of the coal shipped from Flint was sent to Liverpool for onward shipment.

Connah's Quay

6.2.6. The completion of the New Cut in 1737 enabled a small port to be developed mid way up the estuary of the Dee at Connah's Quay. A breakwater was constructed to provide shelter for vessels awaiting favourable winds and tide to navigate to and from Chester. This relative lack of reliance on wind and tide made developing Connah's Quay more attractive than ports higher up the estuary.

6.2.7. Connah's Quay had no collieries itself and needed some means of transporting the coal and other goods to it. The port was linked to the collieries first by the Wepre Iron Road tramway built in 1799 and then the Buckley Railway in 1862.

6.2.8. By the 1880s coal was one of the main goods shipped out of the port, although bricks, chemicals and fertilisers were also handled. Many of the vessels that cleared were foreign-going and served markets in Europe, Ireland and North America. Pit props were imported from Norway and the Baltic (www.cpat.org.uk/projects/longer/ ports/ports.htm).

Mostyn

6.2.9. The harbour at Mostyn is known to have existed in the 1640s and there is some historical evidence to suggest that it existed in the 1399 when Henry Bolingbroke disembarked at 'the Quay of Mostyn' before going on to become Henry IV (www.portofmostyn.co.uk). However there is no firm evidence for a built quay until 1742 when the quay was recorded as incorporating a pier. A tithe map of 1839 depicts a pier with a quay and an adjoining flushing pond, used to clear accumulated silt from the quay (www.cpat.org.uk/projects/longer/ ports/ports.htm).

6.2.10. Coal is thought to have been mined in the vicinity of the port from 1295. It is not known whether it was used locally or shipped (www.portofmostyn.co.uk).

6.2.11. By 1816 port facilities needed improvement in order to keep pace with the demand for coal export facilities. As a result Thomas Telford was commissioned to devise modernisation plans. A new dock was built, protected by a breakwater and linked to a new flushing pond. The port was linked to the Chester to Holyhead railway line by extensive sidings, allowing coal to be brought to the port from other collieries.

6.2.12. The expansion of the iron and steel industry at the port resulted in further demand and port improvements continued. By the end of the 19th century land had been reclaimed using industrial waste and a 680m pier built (www.cpat.org.uk/projects/longer/ports/ports.htm). Eventually the port was able to handle vessels of up to 7,000 tons.

6.2.13. The port remains in use although no longer exports coal.

Talacre

6.2.14. Talacre is on the west bank of the Dee Estuary, at the seaward end. A harbour is known to have been there since the 15th century. There is no evidence for any harbour structures until the early 19th century, when a granary, sluice house and footbridge are known to have existed. Gwespyr sandstone appears to have been shipped from the port (MacRae and Waine 1990: 90)

6.2.15. In the 1860s the port was incorporated within the Point of Ayr Colliery and became a significant coal-exporting port as a result. A dedicated landing stage served by railway sidings was constructed for the colliery. Coal export ceased with the closure of the colliery in 1996 and the port site has been abandoned (www.cpat.org.uk/projects/ longer/ports/ports.htm).

Rhuddlan

6.2.16. A port was an integral part of the castle built at Rhuddlan by Edward I in the late 13th century. Important settlements had been present at Rhuddlan since the Roman period and it is likely that they were associated with port facilities, although no direct evidence has been found.

6.2.17. By the early 19th century a small wooden quay is known to have existed, together with a crane and warehouse facilities. Later in the 19th century a stone-revetted wharf was added (www.cpat.org.uk/projects/longer/ports/ports.htm).

6.2.18. The port at Rhuddlan came to be regarded as being the most important in North Wales until a bridge was constructed in 1880 down-river at Foryd. This prevented most masted vessels, including the ubiquitous schooners, from reaching it. It is not clear to what extent Rhuddlan handled coal shipments, although coal was shipped to the towns of the Vale of Clwyd through the port. Quantities are likely to have been fairly modest.

6.3. COAL HANDLING EQUIPMENT

Pre-modern Periods

6.3.1. Prior to the 19th century, coal was loaded and discharged by hand. Discharge was accomplished by 'coal whippers' or 'heavers', gangs of labourers engaged by the captain of the collier on arrival. The coal could be for example be transferred onto the quayside in baskets or tipped down a chute into a lighter or (if beached) a wagon alongside. Simple cranes could be used to assist.

Modern Period

6.3.2. Once tramways began to replace pack animals for transporting coal to the coast, a more efficient and faster method of loading coal was required. The problems of handling increasingly large volumes of bulk materials on quaysides and then lifting them over the sides of ships meant that more traditional methods of loading were no longer practicable or economic and tended to delay ships in port.

6.3.3. A number of northern ports, notably in Tyne and Wear and Cumbria, had high ground adjoining their quays. They therefore adopted 'overhead loading' as a means of transferring coal from the harbour to the waiting colliers. For example at Whitehaven from 1913 colliers were loaded from a high-level staithe connected to a colliery in the hills above by an ingenious self-acting plane. Waggons could thus be brought onto the staithe and their contents tipped down chutes into the holds of colliers waiting below. When worked to capacity, 500-600 wagon loads could be handled and eight or nine colliers loaded. At Whitehaven the coal staithes were called the 'hurries', such was the speed that they could be operated at (Jackson 1983: 100).

6.3.4. High-level loading was ideal for loading heavy bulk cargoes such as coal. It was quick and the use of gravity dispensed with the need for steam power and expensive labour and kept the quaysides clear for other activities.

6.3.5. However it could be difficult to accommodate changes in the drop caused by the tide and the drop could cause severe damage to the coal. North-east coal had a reputation for toughness, but other coal, such as Welsh coal, could not be handled as roughly.

Furthermore there were geographical limitations, in that not all ports were close to high ground and, if they were, the expansion of the port and its development for other goods might be constrained by the high ground. Such concerns were particularly important during the development of the railways. There was therefore a great need for a low-level means of loading coal in bulk. However low-level loading faced the problem of raising the wagons at the quayside so that their contents could be emptied into the colliers without them having to be emptied onto the quayside and the coal moved by hand or crane. This might require wagons to be lifted as much as 20 metres or more (Bird 1963: 223).

6.3.6. In South Wales the new coal ports were generally built on low ground. Therefore high-level loading was impractical. Steam-powered cranes could be used to assist the use of manpower but despite the availability of cranes capable of handling up to 130 tons of coal (MacRae & White 1990: 10), a means to lift the wagons so that they could be directly emptied into the colliers was needed. Initially attempts were made to use a gravity (balance) mechanism, for example at Cardiff, to raise the whole train on a platform above the quayside but this was expensive as it was wasteful of precious dockside land (Jackson 1983: 102).

6.3.7. The comparatively late development of the Welsh coal ports enabled them to adopt new technologies that did not rely on gravity. The solution adopted was therefore that of the coal hoist or 'tip', using hydraulics to raise individual wagons to the desired height and then tip them automatically so that they discharged into the waiting colliers. The speed of operation that could be achieved was greater than that of any low-level gravity mechanisms (Jackson 1983: 102). As a result coal hoists became the standard and almost universal method of loading Welsh coal in the 19th and 20th centuries (**Plate 2**).

6.3.8. There were a number of different types of coal hoist, a detailed description of which is beyond the scope of this assessment. Most however were of a type built by Vickers Armstrong. They were designed to cope with a variety of coal truck sizes. To cope with 'washed duffs', the small coals used in electricity generating stations in the 20th century that could be hard to dislodge from the wagons, they were fitted with a mechanical shovel (MacRae and Waine 1990: 71). Moveable hoists were favoured as they obviated the need to move the ship during loading and therefore gave greater flexibility of working.

6.3.9. The rapid expansion of the coal ports in South Wales meant that despite their efficiency large numbers of hoists were needed. For example Newport eventually had 21, whilst at Barry in the hectic early 20th century there were 28 (MacRae and Waine 1990: 68-9).

6.3.10. 'Trimming', the safe stowage and balancing of a coal cargo in a ship's holds after it had been lifted on board, was necessary, to cope with the cramped 'tween decks and tiny hatches of wooden ships. However the advent of iron and steel ships with their larger hatches and holds and the Lewis Hunter loading crane (see below) reduced the need for this once essential task and therefore for the 'trimmers' who carried it out. By 1900 it was claimed that trimmers stowed less than 10% of the average coal cargo (Jenkins 1997: 16).

6.3.11. The rough handling and breakage of coal during loading could greatly reduce the value of a cargo. Therefore a number of anti-coal-breakage appliances (ACBs) were developed. The most famous of these was the 'Lewis Hunter' coaling crane. Unusually for an ACB this did not unduly prolong loading and also enabled the cargo to be efficiently distributed, reducing the need for subsequent 'trimming'. It was however more expensive. Lewis Hunter cranes were extensively used in Cardiff Docks, beginning in 1887 in the Roath Dock (Jenkins 1997: 13).

6.3.12. No coal hoists manufactured before 1950 are believed to survive *in situ* or storage in South Wales. It is conceivable although unlikely that a hoist that has been removed from a South Wales port is in use or preservation elsewhere.

7. COAL SHIPS AND SHIPMENTS

7.1. MEDIEVAL PERIOD (1066-1540)

7.1.1. Little data appears to be available in secondary sources with regard to the type and size of vessels engaged in the coal trade during this period. They would undoubtedly have been wooden sailing ships, probably clinker-built with open holds and are unlikely to have been specialised colliers. Few quays or other man-made harbours existed and therefore vessels regularly trading to and from Wales would probably have needed to be able to take the ground in order to load or unload. The available evidence suggests that shipments of coal sent coastwise or overseas from both North and South Wales rarely exceeded 10 tons before the 17th century (Hatcher 1993: 476). This implies the use of small vessels, as does the provision of a fleet of 30 vessels to supply the castle building programme of the 1280s and 1290's (see 5.2.3 above).

7.1.2. No archaeological remains of coal-carrying vessels from this period have been located. However, it is probably reasonable to assume that vessels similar to the 13th and 16th century Magor Pill boats found in Gwent (Nayling 1998) and the Pwll Fanog vessel in the Menai Straits (Jones 1977) would have been used.

7.1.3. Vessels employed in the transporting of coal in Wales appear to have been smaller than those commonly in use in the most significant seaborne medieval coal trade, that from the collieries of Northumberland and Durham. Although the data available is from customs records and therefore restricted to export trade rather than the dominant long-distance coastal trade to London, it appears likely that vessels leaving north-east ports were normally capable of carrying 50-60 tons of coal (Hatcher 1993: 473).

7.2. POST-MEDIEVAL (1540-1799) AND EARLY MODERN PERIODS (1800-1849)

7.2.1. During this period the carriage of coal greatly exceeded the shipping requirements of any other commodity in the UK. In terms of tonnage and storage space it was unrivalled. In 1558 the total of all English-owned shipping probably did not exceed 50,000 tons (Hatcher 1993: 134). Harper has calculated that in 1582 about 11% of the total English tonnage was engaged in the coal trade (Harper 1939: 339). By 1660 over 40% of the tonnage was devoted to coal and of an estimated 90,000 seamen, perhaps 20,000 were engaged in the coal trade. Despite the massive expansion of

overseas and coastal trade devoted to commodities other than coal in the later seventeenth century, about 30% of English tonnage was still devoted to the carriage of coal.

7.2.2. It is difficult to assess the number of vessels involved in coastal trade. Coal-carrying vessels were registered in many ports and tended not to confine themselves to the coal trade. A correspondent in the State Papers of Charles I in 1615 stated that 'what an infinite number of ships and people are now set on work in England by coals, only more than any other kinds of merchandise, by good report to the number of 400 sail of English ships'. By 1624 the navy commissioners were estimating that 300 sail were employed in the Newcastle coal trade alone (colliers were regarded as well suited to naval service).

7.2.3. Estimates of the number of vessels engaged in the east coast coal trade at the end of the 17th century have been up to 1,400 (Hatcher 1993: 472), although many may have done so only on an occasional or seasonal basis, such as the *George* of Port Seton (Hustwick 2000: 78). Assuming that vessel size did not change greatly, Flinn estimates that 500 may have been engaged in the trade on a more or less permanent basis at the beginning of the 17th century and perhaps 1,750 by the 1820s (Flinn 1984: 177). In 1685 there are thought to have been some 180 ships based on the west coast of England and Wales engaged in the coal trade with Ireland (Hatcher 1993: 472).

7.2.4. As with most merchant ships of the 18th and 19th centuries, the vessels used in the British coal trade tended to be owned in shares. This was usually in order to spread the risk and widen the base for the supply of capital.

7.2.5. It is difficult to assess just how busy vessels involved in the coal trade were and when voyages tended to be made. What information is available tends to come from the east coast trade. Shipping naturally tended to avoid the worst of the winter weather and from time to time attempts were made to impose a close season on shipping during the winter.

7.2.6. There is some evidence to suggest that ships could be laid up in the mid-winter months (Flinn 1984: 175). However the high price of coal during that season in London ensured that masters could always be found who were prepared to accept the higher risks. Nevertheless sailings from the north-east to London were most frequent during the months of June through to August (Flinn 1984: 175). Whether this reflects the pattern found in the Welsh trade is uncertain.

7.2.7. The actual number of coal-carrying voyages made per year is similarly difficult to assess as it obviously depends upon the length of the voyage, the time likely to be spent in port waiting for a cargo or to discharge, the effects of the weather and whether the vessel was engaged exclusively in the coal trade. Estimated averages on the east coast appear to be between four and five per year. The size of vessel also appears to have been very significant. In 1800 the highly experienced master Thomas Richmond stated that on the east coast small vessels usually made eight to eleven voyages per year and large vessels rarely more than seven (Flinn 1984: 177).

7.2.8. Crew size is also difficult to estimate because of the lack of records. They were not however large. We know something about recommended quotas in the mid-17th

century which suggest crews of 4-8 seamen. 600 colliers were however estimated to employ a total of 4,500 men and boys, an average of between seven and eight per vessel (Flinn 1984: 180).

7.2.9. One notable collier of the 17th century was the *Royal Escape*, an English smack-rigged collier of 34 tons launched in about 1650 as the *Surprise*. This collier was used by the Prince of Wales to escape after the Battle of Worcester in 1651 before being bought as a yacht after the Restoration (Bosscher 1995: 132).

7.2.10. It has been plausibly argued that during the 17th century the average size of British merchant ships remained small because vessels of 100 tons or less could be built economically with minimal use of imported supplies (Barbour, 1930). Larger ships, it is argued, relied more upon these imported supplies and therefore could only be afforded by the privileged or by monopolised trades, such as the East Indies trade.

7.2.11. However, between 1650 and 1830 and most notably after the mid-18th century the average size of vessels in the British merchant fleet increased significantly. This appears to have been due to the dramatic increase in trade caused by both the Industrial Revolution and colonial expansion and, prior to the end of the Napoleonic Wars, the need to provide vessels with a defensive armament. The size of a vessel was therefore determined by where its normal trading area was and by whether it was being operated in time of war or peace. Nevertheless until the early 19th century the majority of all British merchant ships engaged in both coastal and overseas trade was still less than 200 tons (French 1995: 25). Coastal vessels, which tended to undertake relatively short and less exposed voyages carrying smaller cargo volumes, had less reason to grow in size and remained relatively small.

7.2.12. However the use of larger specialist vessels enabled dramatic improvements in labour productivity to be made, allowing manning levels to be reduced. For example the crew quotas for colliers issued by the House of Commons in 1667 suggested four seamen to a ship of 100 tons, but only eight to one of 300 tons (Hatcher 1993: 479). These economies of scale had the all-important effect of reducing freight costs for coal. This made larger vessels highly attractive to ship owners operating in the highly competitive East Coast trade. As a result by 1785 the average size of vessels used to transport coal from Newcastle to London was estimated at 231 tons (French 1995: 23).

7.2.13. In addition to their small size relative to vessels involved in overseas trade, typical characteristics of coastal vessels of this period were low freeboard, flat sheer and a lack of bulwarks.

7.2.14. From the late 18th century, merchant ships began to be classified by rig rather than hull form. By 1800 almost all vessels of 200 tons or more were three-masted, with those over 350 tons classified as ship-rigged and those between 200 and 350 tons bark-rigged, in other words with no square sail on the mizzen. Vessels of less than 200 tons were normally two-masted and were usually classified as brigs or snows (French 1995: 27).

7.2.15. The collier brig is the most well-known type of 18th century coal carrying vessel on the East Coast. Relatively deep in draught, beamy and short in form, the collier brig was strongly built to cope with the short steep seas of the North Sea and to enable it

to be beached for loading. Highly manoeuvrable, its tall and powerful rig could be handled by a small crew. It was therefore ideal for the coal trade. A number of famous vessels used on voyages of discovery, most notably James Cook's 299 ton *HMS Discovery* were originally collier brigs (Cook also used *HM Bark Endeavou*r, a similar 397 ton former collier).

7.2.16. A 19th century collier brig or schooner has been found at Seaton Beach near Hartlepool. This wreck, now protected, consists of the remains of the lower hull, about 25m long by 7m broad and built of oak frames with treenails. The original vessel was probably about 150-250 tons but its identity and date and manner of loss are unknown (Green 2004: 12-13).

7.2.17. By the 1620s the trade of coal from Mostyn in the North Wales coalfield appears to have been carried out in 'barks'. These were normally single-masted open boats able to carry up to 20-30 tons of coal. Contemporaries such as Sir Christopher Lowther regarded these vessels as being totally inadequate and considered the specialist colliers based upon Dutch fly boat designs that came into use on the east coast in the 17th century as being much more suitable (Hatcher 1993: 476).

7.2.18. By the 1680s however, specialist vessels were starting to be used in overseas trade from the North Wales coalfield and the average size of coal shipments from Chester ports to Ireland reached 41 tons in 1682-3 and 52 tons in 1700 (Hatcher 1993: 476). However the coastal vessels used appear to have remained generally small and the average coastwise shipment from Chester did not exceed 20 tons in the 17th century.

7.2.19. The loss records collated during this assessment (**Appendix VIII**) suggest that during the period 1800-1849, vessels lost on or off the coast of Wales whilst carrying Welsh coal ranged in size from a modest 21 to 278 net tons, with an average of 99 net tons. Small sloops of an average size of 42 tons predominated, representing 41% of those losses identified in terms of rig, with schooners of average size 94 tons also well represented. Brigs are only recorded as having been lost four times. One of these was recorded as being of 73 tons. It is probably reasonable to assume that these figures are also representative of the period 1750-1799, at least in terms of size if not necessarily in terms of rig. Due to the relatively limited scale of exports during the 18th and early 19th century it is likely that relatively fewer specialised coal carrying vessels were used than on the East Coast and that many coal carriers were general cargo carriers that happened to be available.

7.2.20. Caution is however required. In over 60% of the losses recorded during this period the size and type of vessel are not recorded. They are also a small sample of only 72 and therefore may not be truly representative of the number of vessels lost, particularly of small vessels.

7.2.21. Few of the secondary sources consulted during this assessment provide any substantial information with regard to the type and size of vessel used to transport Welsh coal in the 18th and early 19th century. Coastwise vessels clearing the North Wales port of Flint in 1832 loaded with coal averaged less than 60 tons each. Coal-carrying vessels clearing for Dublin in the same period averaged only very slightly more (www.fflint.co.uk/industry.html). It may be that some of the vessels clearing ports in South Wales were larger due to the greater output of the coalfields there, although the limited availability of floating docks during this period is likely to have

restricted the use of very large vessels, except where loading by lighter was undertaken. Further information is probably available in primary sources.

7.2.22. Along the north coast of Wales, flats and sloops were typically used to ship coal coastwise. The flat (often called the 'Mersey Flat') was the sailing barge of the Mersey and Dee estuaries, whereas the sloop was regarded as being the standard coastal vessel of Conway and other North Wales ports. The distinction is however a little ambiguous because larger flats carrying more sail were often described as sloops. Flats appear to have averaged about 60 tons, whereas Welsh sloops, which appear to have been smaller than their English or Scottish counterparts, averaged about 45 tons. The sloops tended to be considerably beamier and deeper in the hold than the flat (Stammers 2000: 56).

7.2.23. There is fairly clear port book evidence however that 17th and 18th century vessels operating coastwise were rarely dedicated entirely to the coal trade. Flexibility appears to have been a basic requirement. As well as carrying other goods on return voyages from the coal ports, they appear to have been regularly deployed to carry other cargoes. For example, although the *Speedwell* undertook a remarkable 15 round shipments carrying coal in 1699, the *Samuel* of Upton carried only one cargo of coal, from Neath to Bridgwater. In the same year it carried several mixed cargoes, including salt and brine (for the processing of which coal was often required), flax seed, herrings, glass, cider, wood ashes, cheeses and hair (Hussey 2000: 136).

7.3. MODERN PERIOD (1850-1913)

7.3.1. Experiments in the use of steam to power purpose-built coal carrying vessels seem to have begun in the 1840s. *Bedlington*, the first iron hulled screw steam collier, was launched in 1841 for the Bedlington Coal Company in north-east England (Macrae & Waine 1990: 12).

7.3.2. Despite this, the introduction of the marine steam engine and screw propeller in the first half of the 19th century did not mean a rapid shift from steam to coal in bulk cargo-carrying vessels. The side-lever engined *Bedlington* was a radical solution to the problems of a particular colliery and the high fuel consumption of the early single cylinder engines and low pressure boilers meant that early steamships were limited in range and competitiveness. As a result sail continued to be the primary motive power for moving coal at sea and steam was largely employed for vessels such as paddle tugs which helped sailing ships into and out of port or for some fast passenger carrying vessels.

7.3.3. However, the period between 1850 and the early 1880s saw dramatic progress in the evolution of the merchant ship. This was due to technological advances in marine steam engines and in the growing use of iron and then steel hulls. Although the sailing vessel reigned supreme on deep sea voyages until well into the 1870s, the year 1865 saw the launch of Alfred Holt's *Agamemnon*, the world's first truly successful iron-hulled compound-engined steamship. By the 1880s such ships were commonly being built of steel.

7.3.4. The improved steam colliers of the 1850s were built largely of iron for lightness and strength. Their form owed much to the 18th century collier brigs, being relatively deep in draught and beamy in form to cope with their bulk cargoes. Although plated

and framed entirely in iron, decks and bulwarks would be of wood, a potential weak point. Gross tonnage seems to have typically been between 500 and 600 gross tons by 1853 ((Macrae & Waine 1990: 15). Sails remained important as an auxiliary means of propulsion.

7.3.5. In the 1850s compound engines with higher working pressures were introduced, together with better screw propellers. Steamships fitted with this type of engine were typically twice as fuel efficient as older engines (Thomas 1992: 11). This reduced running costs and increased range or, for short voyages, left more space for cargo.

7.3.6. Steam power also improved reliability and punctuality, particularly in winter. The work of sailing vessels had been highly seasonal due to weather but the use of steam allowed coal ships to sail independently of wind and tide. A large steam collier might carry up to 1,000 tons of coal and make one return voyage from the north-east to London per week. A sailing collier might typically carry only 200 tons and only make 10-12 voyages per year. The *John Bowes*, a 45m steam collier built in 1852 for the east coast trade and capable of carrying 500 tons of coal, was reputed to be able to do the work of about 10 collier brigs (www.plimsoll.org/diversityofships/ shipsofthesteamage).

7.3.7. The *John Bowes* was the first vessel to have the facility to carry water ballast. This was a very important development in ship technology. Previously a collier that had discharged its cargo had to take on sand or shingle ballast if it did not have a homeward cargo, in order to provide suitable stability. The ship would have to queue to load this ballast and then queue and pay to get rid of it at the end of the return voyage. This was a problem for steam colliers as they relied on being able to make return voyages more quickly than sailing vessels in order to trade profitably. Delays whilst ballasting eroded their advantage in speed. The development of water ballasting avoided this problem. Water ballasting systems have since become ubiquitous for vessels engaged in bulk trades (www.plimsoll.org/diversityofships/ shipsofthesteamage).

7.3.8. A number of other factors assisted the rise of the steamship. Their use was helped by improved port facilities that allowed larger vessels to be handled and more efficiently, together with the opening of the Suez Canal in 1869. The laying of trans-ocean telegraph cables also greatly increased the speed at which return cargoes could be organised.

7.3.9. The improvements in marine technology resulted in a gradual decline in the numbers of sailing vessels still involved in international trade generally. It may reasonably be assumed that this applied to coal-carrying vessels. Although there were about 8,000 British owned and registered sailing ships involved in all aspects of overseas trade in the late 1850s, by 1910 there were less than 500. During the same period the number of steamships involved rose from less than 500 to over 4,000 (Thomas 1992: 15). In 1876, 3,493 and 4,938 sailing ships cleared Cardiff for foreign and coastwise destinations respectively. In the same year 1,971 and 2,019 steamships cleared respectively. However, by 1913 only 291 and 1,732 sailing ships cleared as opposed to 6,216 and 6,092 steamships (Starkey 1999: 100-101). This pattern is repeated in other Welsh coal ports. This suggests that there was a rapid and dramatic decline in the use of sailing ships for foreign trade. In the coastwise trade the decline was less

rapid and sailing vessels still constituted a significant proportion of the vessels carrying coal in the early years of the 20th century.

7.3.10. The period between 1870 and 1913 saw an acceleration in the import of grain and iron ore and the export of coal. As a result it also saw the rise to dominance of the tramp steamer in the coal trade. This was a type of iron or steel merchant vessel that was primarily designed to carry bulk goods (one type of material) but which could also carry general cargo (i.e. mixed) if required. As noted above, vessels engaged in the coal trade generally required a homeward cargo if they were to trade profitably, so a design that could cope with non-coal cargoes was important. Tramp steamers operating from the UK formed a substantial part of the world shipping tonnage by 1913. Average size of vessel in service in the 1870s was 870 gross tons, whilst the average size of those building was 1,050 tons. By 1905 this had increased to 2,250 and 3,300 gross tons respectively (Thomas 1992: 30).

7.3.11. The increase in size seen generally in the tramp steamer fleets appears to have been mirrored in the vessels built as specialist coal carriers, although a wide variety of vessel sizes was involved in carrying Welsh coal. Whilst by the early 20th century companies shipping coal from South Wales to Admiralty ports and also to France often employed large vessels of up to 6,000 tons, the gross tonnage of the known losses of steamships carrying Welsh coal between 1890 and 1913 varied from 69 to 4,293 tons (**Appendix IX**).

7.3.12. Analysis of the statistical records for shipping movements shows that in 1876 1,971 steamships cleared Cardiff for foreign destinations and that they averaged 598 tons. The 2,019 steamships clearing for coastwise destinations in the same year averaged 137 tons. By 1913 6,216 foreign going and 6,092 coastwise steamships cleared respectively and they averaged 1,611 and 333 tons (Starkey 1999: 101). Although these vessels were not all carrying coal, these figures do suggest that the average size of ocean-going and coastwise steam coal carriers in 1913 was about 2.5 times that of an equivalent vessel in 1876.

7.3.13. Many tramp ships were employed as vessels of opportunity and coal might only be one of a number of cargoes carried. The 'Rose' tramp ships owned by the Liverpool coastal shipowner Richard Hughes are a good example of this. Frequently used to ship coal from South Wales to France, they were also very active in the movement of china clay from Cornwall to Cheshire (Evans 2000: 108). The *SS Pontwen* shown in **Plate 4** is typical of the type of steamship employed in the Welsh coal trade in the early years of the 20th century.

7.3.14. The loss records collated for 1850-1913 are a much larger and therefore probably more reliable guide to the size of sailing ships used to ship coal than those for the earlier period (**Appendix VIII**). Except perhaps in respect of very small vessels, these loss records are also likely to be far more comprehensive of the losses that occurred. The number of vessels, 336 as opposed to 72 for the earlier period, also reflects the spectacular rise in demand for Welsh coal that occurred during this period. Vessel type and size are generally given, so it is easier to draw conclusions as to the pattern of vessel usage.

7.3.15. Schooners are by far the most numerous, comprising just under a third of the vessels lost. They varied significantly in size, between small vessels of 26/49 net/gross tons

and large vessels of 692/129 net/gross tons. Average size was about 90 net tons. Ketches and smacks were the next most numerous, comprising about 12% and 13% of the total respectively. These vessels also varied greatly in size. For example a smack of 120 net tons is recorded, although the average was 34. Barques and brigantines were between 7-8% each of the total but were generally much larger vessels. Barques in particular could be very large indeed, up to 1,086 net and 2,062 gross tons (**Appendix VIII**). Only seven of the 359 recorded losses, less than 2%, were iron or steel hulled. One vessel was composite (iron framed, wooden planked).

7.3.16. Iron and steel hulled sailing ships (**Plate 3**) are probably under-represented in terms of the numbers engaged in the trade. It is possible that the relative survivability of metal hulls when going aground, particularly on beaches or sandbanks, has affected this statistic. A more significant reason however, is that these vessels, which tended to be both large and expensive, were often towed by steam tugs through the hazardous inshore parts of the voyage to minimise the risks of the voyage (David Jenkins pers. comm.). Large sailing vessels of all kinds might be towed considerable distances, for example the 1,327 ton N.B. Lewis discussed below was towed in ballast from Dunkirk to Cardiff to collect a cargo of coal for South Africa in 1887.

7.3.17. In 1876 3,493 sailing ships cleared Cardiff for foreign destinations and that they averaged 337 tons. The 4,938 vessels clearing for coastwise destinations in the same year averaged 65 tons. By 1913, 291 foreign-going and 1,732 coastwise sailing ships cleared respectively and they averaged 558 and 100 tons (Starkey 1999: 101). Given the dominance of coal in the outbound trade of Cardiff, these figures suggest that the average size of both ocean-going and coastal sailing vessels engaged in the coal trade increased between 1876 and 1913 by a factor of about 50-60%.

7.3.18. A wide range of records exists for sailing vessels of this period. These include correspondence from ships' officers which contain much information about the vessels and their trade. For example the 1887 correspondence between Captain Frank Gullison of the N.B. Lewis and the ship's owners survives in part. The N.B. Lewis was a wooden ship built in 1880 in Nova Scotia and used in the Welsh coal trade by Lewis Brothers of Yarmouth. At 202 feet in length and 1,327 gross tons, the ship was capable of carrying 2,000 tons of coal.

7.4. MODERN PERIOD (1914-1945)

7.4.1. Towards the end of the 19th century specialised tramp colliers specifically designed for the coastwise trade had begun to appear. The growing use of these vessels was facilitated by a dramatic fall in the price of steamships in the 1920s and the increasing demand for road stone which could be carried in suitably adapted vessels (Batchelor and Chant 2007: 160). These 'coastal colliers' varied in length from 20-122m but were typically about 60m (Batchelor and Chant 2007: 162).

7.4.2. A glut of shipping experienced in the 1920s resulted in large numbers of older vessels being mothballed. Then in the 1930s Dutch motor coasters began to compete with smaller British coasters, prompting the British fleet to gradually shift over to diesel power as freight rates improved. There was also an increasing trend for steam colliers to shift over to oil-firing in place of coal.

7.4.3. The introduction of 'motor ships' with diesels in the 1930s transformed the design of merchant ships generally. Diesels provided vessels with more compact engines that increased cargo carrying capacity. Initially adopted for smaller coastal vessels, the introduction of higher-powered engines enabled diesels to gradually supplant steam engines. They were also increasingly reliable and economical to run, and provided a good power to weight ratio that enabled a greater payload to be carried on a reduced draft.

7.4.4. Their compact size eventually resulted in vessels with aft-mounted machinery supplanting the ubiquitous mid-engined designs, as experience demonstrated that this was a considerably more efficient arrangement. It opened up the cargo deck, easing the task of working the coal and reduced costs by for example eliminating the need for two separate central heating systems and reducing cable and pipe runs (Batchelor and Chant 2007: 163).

7.4.5. Improved tramp ships of a type not dissimilar to the tramp vessels of pre-1913 continued to dominate the export and coastwise coal trade until the mid-20th century. The 1937 built *SS Corferry*, shown in the **Front Cover Plate**, is typical of the coasting colliers built during this period. However post 1955 the shipping of coal gradually became dominated by general purpose bulk carriers. These ships, sometimes called combined carriers, were single deck vessels designed with dual purpose holds which could be used for the carriage of both dry and liquid bulk cargoes (Gardiner 1994: 186).

7.4.6. The Second World War briefly halted the decline of steamships for the carrying of coal, as all available shipping was pressed into service. However the extensive wartime losses tended to be replaced by motor ships, typically of one of the standard wartime designs. The post-war decline of coal exports and the growing reliance on oil and gas in the domestic market resulted in steamships disappearing from use from everywhere except the east coast in the 1960s and a dramatic reduction in the requirement for coal carriers of any sort.

7.4.7. Little information about sailing vessels carrying coal in the post-1913 period was encountered in secondary sources during the assessment. However, 27 loss records for sailing colliers were collated for 1914-1945. This small number almost certainly reflects the very rapid decline in the use of sailing colliers in the first half of the 20th century. Schooners and ketches remained the most common type and some very large sailing vessels are recorded of up to 2,347 net tons. The large vessels were typically iron or steel hulled, but most vessels were still constructed of wood. By the Second World War the use of sailing vessels for transporting Welsh coal had very largely ceased.

8. KNOWN LOSSES

8.1. PRE-MEDIEVAL (TO 1066 AD)

8.1.1. No Pre-Medieval losses of vessels engaged in the coal trade have been identified during the course of this assessment.

8.2. MEDIEVAL PERIOD (1066-1540)

8.2.1. No losses of vessels engaged in the coal trade during the Medieval period have been identified during the course of this assessment.

8.3. POST-MEDIEVAL PERIOD (1540-1799)

8.3.1. The study has not located any loss records for coal-carrying merchant vessels during the period 1540-1750. Only three losses have been recorded for the period 1750-1799. None of these vessels are of a specified type or size. All three vessels are assumed to have been wooden sailing vessels.

8.3.2. Two of the vessels were voyaging from Swansea. The *Providence*, lost in 1751, was lost in St George's Channel whilst bound for Waterford in Ireland. The *Washington* was lost in 1796 as a result of fire whilst in the river at Swansea. The cause of the fire is unknown. The third, the *Neptune*, was lost in 1752 whilst bound for London from Swansea.

8.3.3. Known losses occurring prior to 1800 are listed in Appendix I.

8.4. MODERN (1800-1849)

8.4.1. A total of 72 known losses of sailing ships carrying coal cargoes have been traced within the study area. It is difficult to know how representative this is of the total number of losses of these vessels. However, wreck reporting improved greatly during the first half of the 19th century and the small number of losses during this period as compared to 1850-1913 probably reflects the explosive growth of the coal trade and the consequential increase in the number of vessels carrying coal rather than any significant lack of recording.

8.4.2. Of the 71 losses, 62% were of unspecified type. Given the early date, they will however have been constructed of wood and almost certainly sail powered.

8.4.3. Of the remainder, almost 41% were sloops and 26% schooners. Average tonnage was 42 and 94 net tons respectively.

8.4.4. The largest vessels were barques. The two recorded as being lost during this period were 145 and 278 net tons.

8.4.5. The sample is however small. Whilst it is possible to say with some confidence that sailing vessels used to carry coal during this period were generally small and probably did not exceed 150 tons on a frequent basis, it is difficult to reliably deduce more from the sample. The small size of the vessels probably reflects the small and under-developed tidal character of Welsh harbours at this time.

Type	No.	% (not including unspecified)	Size range and average net tonnage
Barque	2	7.4%	145-278 (211)
Brig	4	14.8%	73
Brigantine	2	7.4%	92
Schooner	7	25.9%	76-141 (94)
Sloop	11	40.8%	21-73 (42)

Type	No.	% (not including unspecified)	Size range and average net tonnage
Smack	1	3.7%	
Unspecified	44		95
Total	71		

8.4.6. All but one of the 67 vessels lost that can be confirmed to have sailed from Wales loaded their coal in South Wales. Three ports dominated, accounting for over 85% of the losses. Newport accounted for 36%, Cardiff 25% and Swansea 22%.

Port of origin	Number
Cardiff	17
Llanelli	6
Newport	24
Swansea	15
Other South Wales ports	4

8.4.7. The destination of four of the losses of vessels loaded with Welsh coal has not been traced. Most of the vessels lost, 50%, were bound for UK mainland ports outside of Wales and the Channel Islands. London, Bridgwater and Liverpool were the most common destinations. About 12% were bound for Welsh ports. Another 21% were bound for Irish ports. Only 9% were bound for overseas destinations, included France, Jamaica, Malta, Egypt and Portugal.

8.4.8. Most of these losses appear to have occurred in UK territorial waters (**Figure 3**). Most are distributed along the coast of South Wales, with a slight concentration in the upper reaches of the Bristol Channel.

8.4.9. Cause of loss details are not always available or entirely clear. However, stranding seems to have been the single most common cause of loss, accounting for 55% of losses. Foundering was the next most common cause, accounting for about 23%. Only one mention is made of collision and none at all of fire or explosion.

8.4.10. No records of Welsh coal carrying steamship losses in the period 1800-1849 have been traced during the course of this assessment.

8.5. MODERN (1850-1913)

Sailing Vessels

8.5.1. A total of 379 known losses of sailing vessels carrying coal cargoes have been traced within the study area for the period 1850-1913 (**Figure 3**). Wreck reporting is generally considered reliable for this period for all but the smallest of vessels, so the sample can be regarded as having a high degree of confidence in terms of the overall number of losses. Only nine vessels were of unspecified type and the large size of the sample gives a high degree of confidence in the statistical reliability of the analysis.

8.5.2. Although this period stretches up to shortly before the First World War, only seven of the losses were iron- or steel-hulled. This may be partly attributable to the relative survivability of metal-hulled ships when driven ashore or onto rocks. However, it may more plausibly relate to the practice that was increasingly common during this period of towing sailing vessels into and out of port using steam tugs. The use of a

tow to negotiate hazardous inshore waters would have been particularly attractive to owners of larger sailing ships and these would have of course included those with very costly iron or steel hulls. Indeed it seems that the practice of towing large sailing vessels considerable distances, even port to port, was not uncommon. Eventually it was not particularly unusual for sailing vessels to be treated as barges and towed all the way back from continental ports by steam tugs or other steamships (David Jenkins, pers. comm.).

8.5.3. A much greater variety of sailing vessel types is in evidence during this period. Sloops ceased to be dominant and only accounted for 5% of the total losses. They were slightly smaller than in the previous period.

8.5.4. The most common type, schooners, accounted for just under one-third of all the losses. They varied very widely in size from 26-692 net and 49-129 gross tonnage and it is clear that the category includes both ocean-going and coastal home trade vessels. Average net/gross tonnage was 90 and 86 respectively. The schooners lost were, with only one exception, wooden hulled.

8.5.5. The second most common type of vessel lost was the smack. These vessels accounted for almost 13% of losses and were typically very small, averaging just 34/46 net/gross tonnage. This type of vessel was probably used almost exclusively for the home trade.

8.5.6. The next most common type was the ketch, which also accounted for just under 12% of losses. Average size was 51 net and 65 gross tons. Maximum tonnage was 75 net and 90 gross, suggesting that ketches were generally intended for the home trade.

8.5.7. No other vessel type exceeds one-tenth of the total. The most common of the larger and probably predominantly ocean/foreign-going vessels were barques of 555/971 net/gross tonnage. Barques accounted for 9% of the total. Larger vessels also included fully rigged ships averaging 1,324/1,554 net/gross tonnage and accounting for about 3% of the losses. These are likely to have been mainly deployed on ocean-going voyages. The smaller brigantines, about 8% of the losses, could have been deployed on either foreign or home trades, although their smaller size probably tended to make their use on very long distance voyages uneconomic and therefore unusual.

8.5.8. Trows represent just over 3% of the total. These traditional craft of the Bristol Channel and River Severn would have been used exclusively in the home trade as they are unsuited to deep sea crossings.

8.5.9. Another 3% were flats. These were the traditional estuary craft of the Dee and Mersey and would not have ventured out of coastal waters.

Type	No.	% (not including unspecified)	Size range and average net tonnage	Notes
Barge	1	<1%	49 NT	
Barque	34	9%	278-1086 (555) / 234-2062 (971)	5 iron hulled; 1 composite
Brig	24	6.3%	98-379 (177) / 238	

Type	No.	% (not including unspecified)	Size range and average net tonnage	Notes
Brigantine	32	8.1%	68-928 (171) / 135-497 (240)	
Chasse-maree	1	<1%	65 NT	
Cutter	1	<1%	26 NT	
Dandy	5	1.3%	43-72 (61) / 46	
Flat	11	2.8%	37-74 (52) NT	
Fully rigged ship	11	2.8%	1193-1678 (1324) / 524-2205 (1554)	
Jigger	1	<1%	80 NT	
Ketch	44	11.6%	28-75 (51) / 40-90 (65)	GT sample only 2
Lugger	3	<1%	43	
Schooner	118	31.1%	26-692 (90) / 49-129 (86)	1 steel hulled
Sloop	19	5.0%	21-69 (37) / 26-44 (33)	
Smack	48	12.7%	11-120 (34) / 28-60 (46)	1 iron hulled
Snow	2	<1%	292 / 346	
Trow	12	3.2%	26-58 (35) NT	
Yawl	1	<1%	58 NT	
Unspecified or uncertain	11	2.9%	173	Includes 1 brig/brigantine
Total	379			

8.5.10. Of the 336 vessels lost that originated in Wales, 96% of these loaded their coal in South Wales. Three ports dominated, accounting for over 70% of the losses. Newport no longer dominated. Cardiff (including Barry) accounted for just over 33%, with 25% from Newport and 13% from Swansea

Port of origin	Number
Cardiff/Barry	113
Britton Ferry	7
Burry Port	3
Milford Haven	13
NE Wales ports	13
Other S Wales	3
Llanelli	18
Neath	3
Newport	85
Pembrey	7
Penarth	5
Port Talbot	7
Porthcawl	10
Saundersfoot	3
South Wales (unspecified)	2

Port of origin	Number
Swansea	44

8.5.11. The destination of approximately 4% of the losses that originated in Welsh ports has not been traced. About 16%, a total of 54, were bound for Welsh ports, mainly the small non-coal ports of North and West Wales such as Caernarfon and Bangor. Another 178, or 53%, were bound for other UK or Irish ports. South-west ports predominated as UK destinations, particularly along the Bristol Channel coast, with 15 bound for Bridgwater and 16 for Bristol. Only one vessel was bound for London. Of the Irish destinations, Cork, Waterford, Wexford and Youghal predominated. A total of 80, or about 27%, were bound for foreign ports.

8.5.12. As has been noted above, most of these losses appear to have occurred in UK territorial waters. Analysis of the losses of sailing vessels departing Cardiff between 1850 and 1913 reveals that most occurred in territorial waters along the South Wales coast and that the largest concentration occurred in the upper part of the Bristol Channel, within 40km of the ports themselves. Vessels departing Swansea show a similar distribution, but without such a pronounced cluster around the approaches to the port itself.

8.5.13. Of the 336 losses of vessels departing Wales, the most common cause of loss appears to be stranding (**Figure 5**). This appears to have accounted for almost 47% of the losses. Most of these appear to have been associated with gale force winds, although a significant number appear to have stranded in Force 4 or less, suggesting either navigational error or attempts to navigate in restricted tidal waters.

8.5.14. Foundering was the next most common cause of loss, accounting for another 33% of losses. Leaks appear to be most commonly associated with gale or storm force winds and no doubt heavy seas. Another 5% of the vessels lost are recorded as having disappeared. Most of these probably foundered out of sight of land.

8.5.15. Collision accounted for 13% of losses. Collisions within the narrow confines of the approaches to the coal ports, particularly those in south-east Wales such as Cardiff and Newport, would have been an ever-present hazard for sailing vessels, particularly with the advent of the fast steamship. Collision is only mentioned once in the 1800-49 period and the rise in its apparent occurrence may be down to the congestion that occurred in the approaches to the coal ports.

8.5.16. Although fire and explosion of the cargo was feared on board coal ships, particularly wooden ones, it is given as the reason for only 2% of the losses. This may be because the coal was being exported and the conditions necessary for fire and explosion were less likely to occur at the start of the voyage.

Steamships

8.5.17. A total of 57 losses of steamships carrying coal either to or from Welsh ports have been traced for the period 1850-1913 (**Figure 2**). As with sailing ships, this figure can probably be accepted with a fairly high degree of confidence.

8.5.18. Steamships constructed of both iron and steel were lost, with iron hulls constituting about 65% of the losses. The earliest steel hulled-steamer to be lost seems to have been the *Prospero* in 1892.

8.5.19. The size of steamships lost varied very widely, with both very small and very large vessels represented. Minimum and maximum net tonnage was 37 and 1,883 and for gross tonnage 69 and 4,293 respectively. Average net and gross tonnage was 470 and 1,204 respectively, with medians of 242 and 817 tons respectively.

8.5.20. All of the 53 steamships lost for which propulsion details have been located were screw driven. The great majority, 77%, had 2-cylinder engines, 11 had 3-cylinder and 1 had 4- cylinder engines. The 3-cylinder engine seems to have been more common in lost vessels from about 1900. More than half, 55%, were compound, with 11 triple expansion and 10 simple.

8.5.21. Most of the lost steamships sailed from Cardiff/Barry or Newport.

Port of origin	Number
Barry	4
Briton Ferry	3
Cardiff	19
Llanelli	1
Newport	19
North Wales	1
Penarth	2
Port Talbot	1
Swansea	5

8.5.22. Of the 55 vessels transporting coal from Wales, just over half were bound for foreign ports. Ports in Spain and France appear to have been the most common destinations, but other vessels were travelling much further, for example to Alexandria and Punta Arenas. A further 27% were bound for Ireland, most commonly Belfast or Dublin, whilst mainland UK ports accounted for another 22%. A smaller percentage of these appear to have been engaged in the trade across the Bristol Channel than with sailing ships. Only one vessel was bound for another Welsh port.

8.5.23. Analysis of the distribution of these losses suggests that most occurred within territorial waters. The majority of losses also occurred within the Bristol Channel. There is a noticeable cluster west of Cardiff.

8.5.24. Five of the losses are recorded as having ‘disappeared’. The most common recorded cause is stranding, involved in almost 38% of the losses. Collision appears to have been the cause of another 32% of the losses. Foundering accounts for another 21%, with another 9% having simply ‘disappeared, probably foundered’. The involvement of fire in these losses is only mentioned in relation to one vessel.

8.6. MODERN (1914-45)

Sailing Vessels

8.6.1. Only 27 sailing vessel losses have been traced for the period 1914-45. Had the average annual loss rate for the period 1850-1913 continued, then this would have resulted in at least 175 losses during this period, without taking into account the additional dangers encountered during the two world wars.

8.6.2. The explanation is simple. During this period (and indeed beginning as early as the 1880s), there was a very sharp decline in the employment of sailing vessels for carrying any form of cargo. Indeed by 1945 their use had largely ceased in both foreign-going and home trades.

8.6.3. Of these 27, some 22 vessels were voyaging to or from Welsh ports. Of these 18, or 82%, were lost in the period 1914-1918. None appear to have been lost in the Second World War.

8.6.4. Schooners continued to be the most common vessel lost, averaging 54 net / 125 gross tonnage. All of the large vessels were barques. They averaged 2,164 gross tonnage and all were iron or steel hulled.

Type	**No.**	**% (not including unspecified)**	**Size range and average net tonnage**	**Notes**
Barque	3	12	2034-2347 (2164) GT	Iron (1) and steel (2) hulled
Dandy	2	8	39-56 (47) GT	
Ketch	7	28	30-60 (45) / 40-81 (53)	
Schooner	12	48	33-76 (54) / 54-199 (125)	
Smack	1	4	62 GT	
Unspecified	2		79-89 (84) GT	
Total	27			

8.6.5. Of the 21 vessels lost whilst voyaging from Welsh ports, 19 had loaded coal in South Wales, with almost 70% of these outbound from Cardiff, Newport or Swansea. Only one vessel, the small schooner *Annie Heron*, was lost shipping coal to Wales when it was stranded at its destination, Port Ysgaden Cove in Caernarfonshire, with a cargo of coal picked up at Liverpool.

8.6.6. Of the 18 vessels under 200 tons, one vessel was bound for Sweden and another for Spain. Otherwise destinations were generally the UK, Ireland and the western seaboard of France. Of the 21 vessels outbound from Wales, 28% were bound for Ireland and another 28% for UK destinations. Two of the three large vessels of over 2,000 tons, the *Inverlogie* and the *Crown of India*, were voyaging very long distances, to Archangel in Russia and Brazil respectively.

8.6.7. The number of losses between 1914 and 1945 is too small for much of significance to be discerned from their distribution. However it can be said that almost all are located in the Bristol Channel or its approaches.

8.6.8. Of the 22 vessels voyaging to or from Welsh ports, enemy action caused or contributed to the loss of ten. Only one of these appears to have been torpedoed, the rest were sunk by submarine gunfire. A total of six foundered, with the cause of loss for the remainder recorded as stranded or driven ashore. The last vessel to be lost, the *Trio*, went aground and broke its back in the River Parrett in Somerset in 1939.

Steamships and Motor Ships

8.6.9. A total of 54 steamships were lost in this period in the study area whilst transporting coal to or from Wales. The great majority, 89% were built of steel. Only 5% were iron-built. One was iron and steel composite and two are uncertain. Interestingly, another two of the steamships, the *Margaret Ann* and the *Hongisto*, lost in 1918 and 1924 respectively, are recorded as having been wooden-hulled.

8.6.10. All of the vessels are recorded in gross tonnage and this ranges from 80 to 6,606 tons. Average tonnage was 2,073, whilst the median was 1,507 tons.

8.6.11. All of the 49 steamships lost for which propulsion details are known appear to have been screw driven. More than half, 69%, had 3-cylinder triple expansion engines. Two-cylinder compound engines equipped about 12% of the losses.

8.6.12. Most of the vessels lost, some 75%, departed from Cardiff, Barry and Newport.

Port of origin	Number
Barry	11
Cardiff	20
Newport	9
North Wales	1
Non-Welsh origin or unknown	3
Other South Wales ports	7
Swansea	3

8.6.13. Only 6% of the vessels lost were sailing to other Welsh ports. Vessels bound for other UK or Irish (including Northern Ireland) ports constituted another 19% each. By far the greatest proportion, some 55%, were bound for further afield. European destinations were most common. Otherwise they were very wide-ranging, including Russia, Egypt, Canada, Zanzibar and even Antarctica (the *Ethel* in 1925).

8.6.14. Of the 49 steamships for which the cause of loss is known, the most common was enemy action, accounting for 48%. These losses were mainly inflicted by submarine-launched torpedoes and guns and mines, with a very few sunk by aircraft. The other common cause of loss was collision, which accounted for 20% of the losses. Foundering and stranding accounted for 13% and 9% respectively.

8.6.15. Most of the losses of steamships occurred within territorial waters, mainly off Pembrokeshire and in the Bristol Channel. However a significant number appear to have occurred further offshore. This is perhaps explained by the prevalence of losses caused by enemy action.

8.6.16. This period saw the introduction of the motor vessel into the loss record. Some eight vessels were lost whilst transporting coal from ports in South Wales, none from North Wales. Tonnage ranged from 118 to 872 gross tons, with an average of 356 and a median of 317. They appear to have been coastal vessels and only one travelled further than the British Isles, the Groningen registered *Neptunus* which was lost in 1920 whilst bound for Malmo from Llanelli.

9. KNOWN WRECKS

9.1. PRE-MEDIEVAL (PRE-1066) TO POST-MEDIEVAL (1540-1799)

9.1.1. No wreck sites of coal-carrying vessels of any type dating to these periods have been identified during the course of this assessment.

9.1.2. Wrecks of vessels dated to before 1540 are exceptionally rare, both off Wales and in wider UK territorial waters. Given the lack of evidence for a coal trade during this period, the prospects of a wreck of a vessel involved in a recognisably Welsh coal trade during these periods being discovered must be regarded as being very remote.

9.1.3. The number of vessels of this period to have been found within the UK is very small, due to issues of survivability and the relatively low numbers of vessels in use. The Welsh coal trade at this time was also very small. Therefore, although the potential exists for the wreck of a coal carrying vessel from this period to be discovered off Wales, the reality is that this is probably very unlikely.

9.1.4. As with the earlier periods, no wrecks of Post Medieval coal-carrying wrecks appear to have been discovered off Wales.

9.2. KNOWN WRECKS: MODERN (1800-PRESENT)

9.2.1. The methodology used for compiling the following description of wreck sites within the study area is described in Section 2 above. It depends largely upon the reliability of text searches of the UKHO wreck database and is therefore unlikely to be comprehensive of all of the relevant sites.

9.2.2. There is a clear disparity between the relatively small number of known wrecks of vessels carrying Welsh coal identified during this assessment (28) and the very large number of known losses. There is also a notable absence of vessels built of lost prior to 1870 and a disproportionate number of losses to enemy action.

SS City of Exeter

9.2.3. The *City of Exeter* (**2004**) was a 17 year old British screw steamship built in 1870 and owned by John Homlin & Sons. With a length of 69.5m, breadth of 8.8m and a depth of 5.2m, gross tonnage was 1,054.

9.2.4. The ship foundered on 11th March 1870 about 4 miles south-west of Lundy whilst on passage from Cardiff to St Nazaire with a cargo of coal.

9.2.5. The UKHO wreck number is 12216. The UKHO record was amended to 'dead' in 2008 when the wreck was not found during hydrographic survey.

SS Pallion

9.2.6. The *Pallion* (**2000**) was a two year old iron screw steamer of the port of London, built in 1871 at *Pallion*. The vessel was 69.8m long and had a breadth of 11.2m and a depth of 4.9m. Gross tonnage was 1146. It was powered by a two-cylinder compound engine developing 120nhp, fed by two boilers.

9.2.7. With 25 crew members on board the *Pallion* foundered about seven miles west of Lundy on 5th November 1873 after its main propeller shaft broke, causing flooding. The ship had been on passage for Suez, carrying coal loaded in Cardiff.

9.2.8. The UKHO wreck number is 12210 and it lies in territorial waters but on the English side of the Bristol Channel. The wreck was surveyed in 1999 when it was recorded as being 160m long, 52m wide and with a height of 4.8m. It was recorded as lying at 055/235 degrees. The identification of the wreck as the *Pallion* is regarded by UKHO as 'probable'.

9.2.9. In 2002 it was reported by a diver that the engine amidships was the highest point, that there were two boilers side by side forward of the engine and that the hull forward of the boilers was broken up. A large winch was reported to be aft of the engine, with a mast on the seabed. Although the wreck is described by UKHO as being intact and upright, it would appear that it is also much broken down, with debris scattered across a wide area. Least depth is given as 49m in a general depth of 56m.

Teviotdale

9.2.10. The *Teviotdale* (**2002**) was an iron sailing barque of 1,695 gross and 1,623 net tons, built in 1882 at Linthouse, Glasgow by A Stephens & Sons. Four-masted and with two decks, it was 266.3ft (81.1m) long, 38.6ft (11.9m) breadth and 22.7ft (7m) depth. Registered at the port of Glasgow, its official number was 86715 and it was classified 100 A1 by Lloyds. At the time of loss the vessel was owned by John & A. Roxburgh of Glasgow.

9.2.11. The *Teviotdale* was lost with 17 of its 29 crew on 15th October 1886 whilst on passage for Bombay from Cardiff with a cargo of coal. The ship was, not untypically, initially towed by two tugs. However further down the Bristol Channel under its own power, *Teviotdale* encountered a severe south-westerly gale and heavy seas. Most of the rigging was lost and when the vessel shipped a heavy sea, the cargo shifted and flooding occurred. The crew failed in an attempt to run to Penarth Roads and the vessel was blown into Carmarthen Bay, stranding on Cefn Sidan Sands. Attempts to rescue the crew led to the loss of a local lifeboat and fatalities (http://web.onetel.com/~rapanui/more_shipwrecks.htm). Two days later the wreck had moved a mile further towards the Tywi estuary.

9.2.12. The UKHO wreck number is 12356 and it is in territorial waters. General depth is given as -3m. The wreck is intertidal and substantial remains are still visible. It is considered dangerous because of its proximity to the Guy Channel. A photograph of what appears to be a section of the bow or stern of the vessel in 1976 can be seen at http://web.onetel.com/~rapanui/more_shipwrecks.htm. The wreck is one of a reported group of at least five wooden and two iron wrecks in the intertidal zone of Cefn Sidan ('Silken Sands').

Sovereign

9.2.13. *Sovereign* (**2006**) was an 11 year old 1,224 gross ton fully-rigged wooden sailing ship of Halifax, Canada. Owned by J M Blaikie of Derry, the ship was 61.6m long, 11.9m in breadth and 6.7m in depth. It was built in 1879 by J. Gleddes of Nova Scotia.

9.2.14. Under the command of W. Putnam, the *Sovereign* was lost on 19th February 1890 after colliding with the *SS Highgate* approximately nine miles north-north-east of Lundy in the Bristol Channel. The vessel was, at the time, on passage for Montevideo from Cardiff with a cargo of coal. Of the 17 crew, five were lost.

9.2.15. The UKHO wreck number is 12281. The identity of the wreck as the *Sovereign* cannot be regarded as being secure as the wreck position lies about 18 miles north-north-east of Lundy. The wreck position is within territorial waters. It was located during hydrographic survey in 1978, when it was found to have a least depth of 49m in a general depth of 50m. No scour was observed and the wreck was 60m long and lying at an orientation of 080/240 degrees. It was described as being mainly intact but with some debris nearby. It was interpreted as probably inverted and well buried.

SS Clydesdale

9.2.16. The *Clydesdale* (**2005**) was a nine year old, 972 gross ton well-deck steel screw steamship of the port of Glasgow. Built in 1881, the vessel was owned by R. Mackill of Glasgow and captained by J. Sim at the time of loss. It was classified 100 A1 by Lloyds. The ship was 65.2m long, 9.4m in breadth and 7m in depth. *Clydesdale* had a crew of 18.

9.2.17. On 28th March 1890 the ship foundered off the coast of Pembrokeshire. According to Lloyd's List as quoted by UKHO, the ship was on passage for Dublin after loading coal at Bilbao. The Abstract of Wrecks says that it was travelling from Glasgow to Bilbao and if both reports are correct it may have been on a leg of a longer voyage. The *Clydesdale* was also carrying six passengers.

9.2.18. The UKHO wreck number is 12134 and the wreck position lies in a general depth of 75m in territorial waters off the north coast of Pembrokeshire. However, UKHO records were amended to 'dead' in 1981 when the wreck was not found during hydrographic survey.

SS Musgrave

9.2.19. The *Musgrave* (**2007**) was a 21 year old iron screw steamship of the port of Grangemouth, built by Edward Linsey at Newcastle in 1871. Owned at the time of loss by T. Harries of Swansea, the vessel was 39.9m long by 6.7m in the beam and 3.0m in depth. The vessel was 252 gross tons and was powered by a 40hp two-cylinder composite engine.

9.2.20. Early on 24 September 1892 the *Musgrave* set out from Briton Ferry with a cargo of coal for Dundalk. The vessel was under the command of David Jones. In a south-easterly force six and poor visibility the captain made a navigational error and failed to keep clear of the Sledges reefs. *Musgrave* hit the rock called 'Llech Uchaf', about one mile west of Penclegyr Point, Pembrokeshire and sank. All of the nine crew members survived.

9.2.21. The UKHO wreck number is 12123 and the wreck lies in territorial waters. It is described in a 1996 report apparently submitted by divers that the wreck was broken in two parts, with the stern in 30m and the bow upslope in 20m. The boilers and engine are described as being at 30m. General depth is recorded as 20m.

9.2.22. The wreck is a well-known recreational dive site (http://www.celticdiving.co.uk/divesites.htm) and was the subject of an article in the diving press (Liddiard et al. 2009). The article contains a description of the main features of the wreck and its environment and a sketch plan. The wreck is described as lying inverted in two sections at 23-28m. The wreck is much broken up and considerable debris, including a boiler and the engine are lying outside of the hull. A single plate rudder with a curved tiller is described.

SS Theme

9.2.23. The *Theme* (**2008**) was an 1895 built British screw steamship of 130 net tons. It was fitted with a compound engine and a single boiler. It was owned at the time of loss by W. A. Grainger of Belfast, where the ship was registered .

9.2.24. On passage under the command of J. Ferguson from Swansea to Belfast with a cargo of coal and 11 crew, it was last seen off Bardsey Island on 25th December 1895. It was not seen again and was subsequently posted missing at Lloyds. It probably foundered, although it is conceivable that it could also have been involved in a collision.

9.2.25. The UKHO wreck number is 7348. The wreck lies in territorial waters approximately eight miles north-east of Anglesey. It was surveyed in 1976, when it was recorded as having a least depth of 59m in a general depth of 63m, with a scour depth of 7m. It was described as intact and upright, but just protruding above the level of the surrounding seabed. It appears to have been dived in 2001 when it was described as intact and upright with bows smashed. A bell was recovered inscribed with a date of 1894.

SS Salado

9.2.26. The *Salado* (**2011**) was a part steel, part iron screw steamship of the port of London, official number 98124. Built at Middlesbrough by Messrs Raylton, Dixon and Company Ltd in 1890, the vessel was owned at the time of loss by the Buenos Aires Great Southern Railway Company Ltd. With a length of 277ft (84.4m), breadth of 39ft (11.9m) and depth (to main deck) of 18.2ft (5.5m), the vessel was 2,187 gross and 1,404 net register tons. It was a single deck, well deck design. It was powered by three-cylinder triple expansion direct-acting vertical engines of combined 202nhp, working off two steel boilers.

9.2.27. The seven year old vessel (Lloyds Register class Ll. + 100 A1), left Newport on the evening of 20th March 1897 bound for Buenos Aires under the command of James M. Rainie, with a cargo of 2,554 tons of coal. On board were 22 crew and three passengers, two of whom were the captain's children.

9.2.28. Proceeding down the Bristol Channel the vessel encountered increasingly dense fog with a WSW Force 2 wind. At about 04:40 on 21st March the vessel struck and went ashore on the Mouse Trap Rock on the Gannet Stone on Lundy, within 30 feet of the cliffs. Efforts to get the vessel off by going astern failed and it became a total loss as it went broadside on to the rocks in the tide.

9.2.29. The subsequent Court of Inquiry (Report of Inquiry No. 5518, Reports of Inquiries into Wrecks 1896-7) held that the accident was caused by the vessel being navigated

at too great a speed in the fog and by failure to use a sounding lead sufficiently often. Mr Rainie's master's certificate was suspended for 3 months.

9.2.30. The wreck is recorded by the UKHO as number 12240, with the following position: 51º 11.479' N, 04º 39.900' W. No further details of the wreck are given, other than a general depth of 3m.

SS Dalserf

9.2.31. The *Dalserf* (**2013**) was a one year old single deck steel screw steamship of the port of Glasgow, official number 129439, owned at the time of loss by James Campbell of Middlesbrough. Built in 1909 at Stockton-on-Tees by Richardson, Duck and Company, the vessel was 1,849 and 1,017 gross and net register tons respectively. Length was 260.2ft (79.2m), breadth 40ft (12.2m) and depth 17.7ft (5.5m). Power was supplied by a set of vertical direct acting triple expansion three-cylinder engines, generating 209 nhp from steam supplied by two steel boilers.

9.2.32. The vessel left Penarth in the evening of 9th July 1910, bound for Oban, Scotland with 2,652 tons of coal for the Admiralty. The vessel was under the command of Evan Williams, one of 19 crew. The vessel proceeded down the Bristol Channel in good conditions. However, by 04:00 when the vessel was off the Pembrokeshire coast it was enveloped by thick fog. Just after 08:00 on the 11th, the ship ran onto rocks on the southern side of Grassholm Island, about 9 miles off the Pembrokeshire coast, as a result of navigational errors made by the master. Although the engines were put full astern, the ship remained fast on the rocks and began to fill with water.

9.2.33. The subsequent action of the strong tides experienced in the locality caused the *Dalserf* to work further onto the rocks and although salvage operations were commenced on the same day and continued until 22nd August, the vessel was eventually declared a total loss and abandoned in a grounded and partially submerged condition. A photograph of the ship taken during the salvage operations exists in the collection of Trevor Owens (Bennett, 1992: 29).

9.2.34. The master was severely censured by the subsequent Court of Inquiry. However, owing to his previous unblemished record, his certificate was not suspended.

9.2.35. The UKHO wreck report, number 12051, describes the wreck as being well broken up in a general depth of 26m, with its bow in 10m of water, the stern in 30m and a boiler (2m in height) in 26m. The seabed is described as rocky with small stones. The wreck description is dated 1979 and the site appears to have been reported to the UKHO by divers in 1968. Bennett describes the wreck as being in 17-23m on a "rock and small stone" seabed, scoured by currents of up to 4.5 knots (2.32 m/s). Bennett describes the position as being 150m south of East Trump, although the accompanying diagram shows it to be west-south-west (Bennett 1992: 30). Visibility is described as being good. Grassholm Island is home to an important gannet colony.

SS Tenet

9.2.36. The *Tenet* (**2014/2015**) was a two year old single deck well deck steel screw steamship of the port of Belfast, official number 129631, owned at the time of loss by W. A. Grainger. Built in 1910 by Workman, Clark and Co. Ltd. in Belfast, the vessel was 186.8ft (56.9m) long, had a breadth of 28.7ft (8.7m) and a depth of 11.8ft (3.6m). Gross tonnage was 606 tons and registered 233. Power was supplied by one

set of inverted direct acting triple expansion condensing three-cylinder engines, generating 79nhp from steam supplied by a single steel boiler.

9.2.37. The ship left Newport at 19:00 on 28 October 1912, bound for Derry, Northern Ireland with 714 tons of coal. The ship was under the command of Thomas Ferguson. By the time the vessel was approaching St Ann's Head, it had encountered a strong west-south-west wind and a heavy sea. However, none of the surviving crew seem to have regarded the conditions as being out of the ordinary.

9.2.38. At about 06:20 the *Tenet* was hit by a heavy sea that struck from abaft on the port beam, causing flooding forward. The ship listed and failed to answer the helm. As seas continued to break over the vessel, the list increased and the cargo shifted. The ship then quickly capsized. The survivors saw the vessel floating keel up before they were rescued. Tragically six of the crew died, including the master.

9.2.39. The Board of Inquiry investigated the stability of the vessel and concluded that although the cargo was properly stowed, the ship was overloaded and that the loss was caused by a combination of flooding as a result of shipping heavy seas (the mate failed to ship and fit storm boards) and the cargo shifting as the vessel listed. Some but not all blame was attached to the ship-owner's manager for failing to assure himself that the ship was stable before it sailed.

9.2.40. There are two UKHO wreck reports, numbers 12091 and 12095, reflecting uncertainty about where the wreck lies. 12091 is the sinking position given by Lloyds. It has not been located there by hydrographic survey and the record is classified as 'dead', but the wreck does not appear to have been subject to a specific search. A wreck was found in the position given for 12095 in 1969. Both positions are within the 12 mile limit and about 1300m apart. General depths are given as 22m and 10m respectively, but there are no other details. Given that the ship was observed by the surviving crew to be floating in a capsized condition, it may be that it floated away from the loss position before sinking and that 12095 is the correct wreck position. Alternatively the loss position may be incorrect (establishing a precise position is unlikely to have been the first thing on the minds of both survivors and rescuers).

SS Corundum

9.2.41. The *Corundum* (**2016**) was a 15 year old single/well deck steel screw steamship of the port of Glasgow, official number 108783, and classified by Lloyds as 100 A1. It was owned at the time of loss by J. Stewart & Company. Built in 1899 at Bowling by Scott and Sons, the vessel was 1,203 and 736 gross and net register tons respectively. Length was 230ft (70.1m), breadth 35.1ft (10.7m) and depth 13.9ft (4.24m). Power was supplied by a set of triple expansion three-cylinder engines, generating 96nhp from steam supplied by a single steel boiler.

9.2.42. The ship sailed from Burry Port with a cargo of coal for Rouen in France. No Court of Inquiry report has been traced. However, it seems that on 17th October 1914 the vessel was in collision with the *SS Kyleness* about one mile west of the Helwick Lightship in the Bristol Channel. The *Corundum* sank as a result. No lives were lost, the crew presumably being rescued by the other vessel.

9.2.43. The UKHO wreck report is number 11961. This describes the wreck as having been surveyed using sidescan in 1977. It was then intact and on its side between sandwaves. Orientation is 170/350 degrees. The wreck had a length of 108m, which suggests that it was at least partly broken up. General depth was recorded as being 40m, with a least depth of 36m and a scour of 2m. No more recent description is available. The wreck lies within territorial waters.

9.2.44. The UKHO wreck report describes the identification of this wreck as the *Corundum* as being probable. However their description of the loss location as being six miles south-west of Helwick Light is at odds with the Return of Shipping Casualties position given above and there must therefore be some room for doubt with regard to this identification.

SS Strathnairn

9.2.45. The *Strathnairn* (**2017**) was a 9 year old single deck steel screw steamship of the port of Glasgow, official number 121347, and classified by Lloyds as 100 A1. Owned at the time of loss by Strathnairn Steamship Company Ltd., it was built in 1906 by A. Rodger & Co. at Port Glasgow. The vessel was 4,366 and 2,812 gross and net register tons respectively. Length was 370ft (112.8m), breadth 52.2ft (15.91m) and depth 17.6ft (5.36m). Power was supplied by a set of three-cylinder triple expansion engines, generating 354nhp from steam supplied by three steel boilers.

9.2.46. Bound for Archangel in Northern Russia with a cargo of coal loaded in Penarth, the vessel was torpedoed by *U-22* on 15 June 1915 and sunk. The loss is recorded as being 25 miles north-east of the Bishops and Clerks (rocks), off the north coast of Pembrokeshire.

9.2.47. The UKHO wreck report is number 9896. The position for this wreck lies outside territorial waters. It is last noted as having been surveyed in 1980. Least depth was 76m in a general depth of 94m and the sidescan anomaly was 130m long. This suggests that the wreck was partly intact at that date. Orientation was 045/225 degrees.

Faith

9.2.48. The *Faith* (**2019**) was a 56 year old single deck wooden sailing schooner of the port of Beaumaris. Official number was 21778. Built in 1860 by Holmans in Topsham, Devon, the vessel was 80ft (24.4m) long and had a breadth of 18.5ft (5.6m) and a depth of 8.8ft (2.6m). Tonnage was 76 and 58 gross and net tons respectively and the vessel was owned at the time of loss by E. Hughes of Borth-y-Gest.

9.2.49. *Faith* was stranded and lost about a quarter of a mile south-west of St Ann's Head, Pembrokeshire on 23rd September 1916 whilst carrying coal from Cardiff to Wexford. All three crew members survived.

9.2.50. The UKHO wreck number is 11990. The wreck lies within territorial waters. It seems to have been dispersed in 1916, presumably because it represented a hazard to shipping. The UKHO status is therefore 'dead'.

SS Bestwood

9.2.51. The *Bestwood* (**2021**) was a one year old single/well deck steel screw steamship of the port of London, official number 135288, and classified by Lloyds as 100 A1.

Owned at the time of loss by Fenwick and Co. Ltd., it was built in 1913 by S.P. Austin & Son Ltd. in Sunderland. The vessel was 2,248 gross and 1,287 net register tons. Length was 280ft (85.3m), breadth 40.5ft (12.3m) and depth 18.5ft (5.6m). Power was supplied by a set of three-cylinder triple expansion engines and two steel boilers, generating 221nhp.

9.2.52. On the 29th July 1917 the *Bestwood* under the command of F. Dyasan collided with *SS Leander* approximately 12 miles north-west of the South Bishop Lighthouse, off Pembrokeshire. The *Bestwood*, described as an Admiralty collier, was carrying a cargo of coal and fresh water for the Admiralty from Cardiff to a naval base in Loch Ewe, Scotland. Sixteen lives were lost.

9.2.53. The UKHO wreck number is 12164. The wreck is just outside territorial waters. According to UKHO records the wreck was last examined in 1980 by *HMS Bulldog*. Partly intact and clearly defined on an undulating sandy bottom, the wreck had a large hold visible amidships. Anomaly dimensions were 78m by 13m. The orientation of the wreck was 120/300 degrees, with the bows to the north-west. Least depth was 92m, suggesting a vertical height of wreck of up to 10m. According to the UKHO, the identity of the wreck as being the remains of the *Bestwood* has not been confirmed.

SS St Jacques

9.2.54. The French steel screw steamship *St Jacques* (**2023**) was built in 1909 in France and owned at the time of loss by the Société Navale de l'Ouest. The ship had a length of 288.8ft (85.3m), a breadth of 38.9ft (12.3m) and a depth of 16.6ft (5.6m). Tonnage was 2,459 gross and 1,339 net. The ship had two steel boilers providing steam for three-cylinder triple expansion engines developing 221nhp.

9.2.55. On 15th November 1917 in the Bristol Channel off St Ann's Head, Pembrokeshire and whilst on passage from Barry to Bizerta in France with a cargo of coal, the ship was torpedoed on the starboard side by *UC-51* and sank within 15 minutes.

9.2.56. The UKHO wreck number is 58707. The wreck is in territorial waters. The wreck's identity appears to have been first suggested to UKHO in 1998. Prior to this it was regarded as being an unknown. It is described as being well broken up and partially buried. It has a least depth of 29m in a general depth of 33m, although in 1998 it was described in the reporting history as standing up to 8m high.

9.2.57. The wreck clearly receives visits from avocational divers and in 2004 it was described by one diver as lying largely flat on a sandy seabed. The bow lay to the east, separated from the rest of the wreck and lying on its starboard side with anchor winch, deck fittings, gun mount and bollards close by. Hull plates were partly buried in sand. Debris lay on either side of the hull. The stern with propeller was also separated from the rest of the hull. A second spare propeller was reported to lie partially buried nearby. Photographs and a description and diagram of the wreck were published in the February 2004 edition of *Diver* magazine.

SS Aghios Spyridon

9.2.58. The *Aghios Spyridon* (**2025**) was a 29 year old, 1618 gross ton Greek screw steamship built in 1878 by W. Grey & Co. in West Hartlepool. The vessel had a length of 259ft (78.9m), a breadth of 35.1ft (10.7m) and a depth of 19ft (5.8m) and

was powered by compound expansion engines of 175hp supplied with steam by two boilers.

9.2.59. On 12th February 1917, the ship was torpedoed and sunk in the Bristol Channel by *U-47* whilst on passage from Swansea to Naples with a cargo of coal.

9.2.60. The UKHO number is 12265. The wreck lies in territorial waters, although on the English side of the median line along the Bristol Channel. The wreck was described as a result of a hydrographic survey in 1977 as being partly intact with possible scattered debris about 200m to the south-west. Orientation was 090/270. Least depth was 37m in a general depth of 45m and the sonar anomaly was 80m long.

SS Gisella

9.2.61. Built in 1904 as *Gisella Groedel* by W. Gray & Co. Ltd. of West Hartlepool, the *Gisella* (**2022**) was a single deck iron and steel screw steamship registered at the Port of London. The ship's official number was 118402. Length was 313.5ft (95.5m), breadth 44.3m (13.5m) and depth 20.5ft (6.2m). Gross tonnage was 2,502 and net 1,603. The vessel was powered by a three-cylinder triple expansion engine developing 255nhp and had two steel boilers. The vessel was owned by Groedel Brothers Steamship Co. Ltd. and listed as 100 A1 by Lloyds.

9.2.62. On 18th November 1917, whilst carrying a cargo of coal loaded in Cardiff and under the command of F.G. Bissett, the ship was torpedoed by *UC-77* when two miles south-west by south of Skokholm Island, off St Ann's Head, Pembrokeshire.

9.2.63. The UKHO wreck number is 11981, although the UKHO does not regard the identity of this wreck as the *Gisella* as confirmed. The wreck lies within territorial waters. It appears to have been last surveyed in 1980 when the wreck was described as being well broken up. The wreck had an orientation of 065/245 degrees, with a least depth of 50m in a general depth of 57m.

SS Gurli

9.2.64. The *Gurli* (**2029**) was a 578/323 gross/net ton 9 year old Norwegian steel screw steamship. Built in 1908 in Lodose, the ship was 167ft (50.9m) long, 28.2ft in breadth and 11.8ft (3.6m) in depth. It was powered by two-cylinder compound expansion engines fed by two boilers generating 66hp and carried a crew of 14 when lost.

9.2.65. The *Gurli* was on passage from Swansea to Rouen under the command of a Mr Iversen with a cargo of coal when it foundered 2.5 miles south-west of Lundy in the Bristol Channel on the 26th November 1917. No lives were lost.

9.2.66. The UKHO wreck number is 12208. The position given lies in territorial waters but on the English side. The wreck was not located during a geophysical survey in 2008 and the UKHO has therefore listed the wreck as 'dead'.

SS Boscastle

9.2.67. The *Boscastle* (**2030**) was a 12 year old steel single deck screw steamer of the port of West Hartlepool, official number 132828 and registered as 100 A1 by Lloyds. Built in 1912 by W. Gray and Co. Ltd. in West Hartlepool, the vessel was owned at the time of loss by the Hatfield Steamship Company Ltd. With gross and net tonnages of

2,346 and 1,452 respectively, the vessel was 298ft (90.8m) long, with a breadth of 44.7ft (13.6m) and a depth of 19.9ft (6.1m). It was powered by three-cylinder triple expansion engines generating 260nhp and had two steel boilers.

9.2.68. On 7th April 1918 the *Boscastle* was torpedoed and sunk by *U-111* about 14 miles north-north-west of Strumble Head, Pembrokeshire. The ship had been on passage from Barry to the naval base at Scapa Flow with a cargo of coal.

9.2.69. The UKHO wreck number is 9898. The wreck, which lies outside territorial waters, was possibly detected by a naval escort group in 1945 and was surveyed in 1980 by *HMS Beagle*. The wreck was described as having a length of approximately 75m with a least depth of 72m in a general depth of 78m, suggesting that the wreck was partly broken up. Orientation was 045/225 degrees. The UKHO regard the identification of the wreck as being the *Boscastle* as 'possible'.

SS Sarpfos

9.2.70. The *Sarpfos* (**2034**) was a single deck Norwegian steel screw steamer with a schooner rig. Built in 1910 in Norway, the vessel was owned at the time of loss by Akties of Manchester. The vessel was 254.5ft (77.6m) in length, 39.2ft (11.9m) in breadth and had a depth of 16.5ft (5m). Gross and net tonnage was 1,458 and 890 respectively. *Sarpfos* was powered by three-cylinder triple expansion engines generating 152nhp.

9.2.71. *Sarpfos* was torpedoed and sunk by *U-105* off the Skerries, Anglesey on 24th February 1918. The ship had been under the command of W. Horn and was on passage from Swansea to Odde with a cargo of coal.

9.2.72. The UKHO wreck number is 7385. The location lies outside territorial waters. Searched for in 1976 in a general depth of 105m, the wreck was not found and the conclusion drawn was that the wreck did not lie in the charted position. The status of the wreck is therefore currently 'dead'.

Elizabeth Alice

9.2.73. The *Elizabeth Alic*e (**2035**) was a Russian 152 gross ton wooden sailing schooner that is reported to have foundered 1 mile north-east of Wooltack Point in Jack Sound, off St Anne's Head, Pembrokeshire on 17th October 1920. The vessel was carrying coal from Swansea to Malmo.

9.2.74. The UKHO wreck number is 12064 and the position lies within territorial waters. In 1979 a 7.5m high wreck was detected in a general depth of 36m. However a subsequent hydrographic survey in 1980 and diver searches aided by magnetometry in 1995 have failed to detect the wreck. It may be that the previous detection was inaccurate. Alternatively it is possible, although unlikely, that the wreck collapsed between 1979 and 1980 and became buried by 1995.

SS Canterbury Bell

9.2.75. The *Canterbury Bell* (**2036/2070**) was a three year old single/well deck steel screw steamer of the port of London, official number 143297 and Lloyds 100 A1. Built in 1919 in South Shields by C. Rennoldson & Co., the vessel was owned at the time of loss by Haig Shipping Company Ltd. With a length of 180.4ft (55m), a breadth of 38.1ft (11.6m) and a depth of 12.4ft (3.77m), gross tonnage was 703 and net 319.

The vessel was powered by three-cylinder triple expansion engines producing 110nhp and had two steel boilers.

9.2.76. On 5th January 1922 whilst on passage for Corcubion from Llanelli with a cargo of coal, the vessel capsized and sank.

9.2.77. The UKHO wreck number is 12264. It was located during hydrographic survey in 1977. It was described as being intact, with a length of 60m. With an orientation of 120/300 degrees, it had a least depth of 54m in a general depth of 58m.

SS Ethel

9.2.78. The *Ethel* (**2038**) was a 47 year old iron screw steamship of engines-aft design belonging to the port of London. Official number 67509, it was built by R. Craggs & Sons in Middlesbrough in 1878 and owned at the time of loss by the Eltham Shipping Company Ltd. Of 178 gross and 91 net tons, the vessel was 120.2ft (36.6m) long, 19.9ft (6.1m) in breadth and 8.4ft (2.6m) in depth. The vessel was powered by a two-cylinder compound expansion engine developing 30rhp and had a single steel boiler.

9.2.79. On 27 March 1925 the *Ethe*l foundered approximately 15 miles north-north-west of Strumble Head, Pembrokeshire whilst on passage for from Newport to Dublin with a cargo of coal. The vessel was under the command of a Mr G. Gardiner.

9.2.80. The UKHO wreck number is 67509. The wreck, which lies within territorial waters, may have been detected by a naval escort group in 1945. It was detected as a sonar and magnetometer contact by *HMS Beagle* in 1980 when it had a length of 35m and a least depth of 61m in a general depth of 65m. The wreck has been intrusively investigated by avocational divers and the recovery of a ship's bell marked 'SS Ethel 1878' was reported to UKHO in 2007. The reporter described the wreck as lying upright, mostly intact and with its bows to the south.

SS Mervyn

9.2.81. *Mervyn* (**2041**) was a 14 year old single deck screw steamship of the port of Newport, official number 145647. Built by R. Thompson & Sons in Sunderland in 1924 and owned by Mervyn Steam Shipping Co. Ltd., the vessel was 337.4ft (102.8m) long, 48ft (14.6m) in breadth and 22.5ft (6.9m) in depth. Gross and net tonnage was 3,402 and 2,066 tons respectively. The ship was powered by three-cylinder triple expansion engines developing 322nhp and had two steel boilers.

9.2.82. On 11th January 1939 whilst on passage from Barry to Lisbon with a cargo of coal, the *Mervyn* was involved in a collision with *SS Langleeford* about 10m south-east of the Smalls off Pembrokeshire. The ship sank as a result.

9.2.83. The UKHO wreck number is 11931 and the wreck lies outside territorial waters. It is regarded as being probably that of the *Mervyn*. It may have been located in 1945 but a wreck was definitely located at the location in 1979, when it was described as being approximately 100m long, 17.5m high and orientated 225/045 degrees. In 1980 it was resurveyed by *HMS Bulldog*, when the wreck was described as being 117.2m long and 13.4m wide, with a least estimated depth of 57.2m in a general depth of 70m. This suggests that the wreck was, at that time, largely intact. Orientation was recorded as 039/219 degrees.

SS Leonard Pearce

9.2.84. The *Leonard Pearce* (**2044**) was a single deck steel screw steamer of the Port of London. Built in 1938 by S.P. Austin & Son Ltd of Sunderland, the ship was owned at the time of loss by the London Power Company Ltd. Official number was 166520 and Lloyds classification 100 A1. With a length of 239ft (72.8m), a breadth of 38.7ft (11.8m) and a depth of 16.2ft (4.9m), the ship had a gross tonnage of 1,571 and net of 913. Power was supplied by a triple expansion three-cylinder engine of 193nhp and there was a single steel boiler.

9.2.85. On 11th January 1940 whilst the vessel was on passage for London with coal loaded at Barry and when at about 303 degrees, 9 miles from Bull Point Light in the Bristol Channel, the ship was involved in a collision with the *SS Queen Adelaide* and sank.

9.2.86. UKHO wreck number is 12254 and the wreck is in territorial waters on the English side of the median line running down the Bristol Channel. Surveyed in 1977 it was described as having an intact hull intact, although it was measured as being only 60m long. The superstructure was described as broken up. Orientation was 060/240 degrees, with a least depth of 35m in 46m general depth.

SS Thorold

9.2.87. The *Thorold* (**2042**) was a steel machinery aft screw steamship of the port of Montreal and a former Canadian Lakes cargo vessel. Built at Newcastle in 1922 by Swan, Hunter & Wigham and owned at the time of loss by the Quebec & Ontario Transportation Company, the vessel's official number was 146589. Length was 250ft (76.2m), breadth 43.1ft (13.1m) and depth 16.9ft (5.2m). Gross tonnage was 1,689 and net 987. The vessel was powered by a three-cylinder triple expansion engine of 106nhp.

9.2.88. On 22nd August 1940 the *Thorold* was bound for London under the command of Captain Mr H. Jackson after loading a cargo of coal in Cardiff. When about two miles south of the Smalls Lighthouse off Pembrokeshire and in rough seas, it was attacked by three German aircraft. The ship was hit by bombs which destroyed the bridge and radio rooms and penetrated the holds. As the ship sank it was machine-gunned for about an hour. The St David's Lifeboat was launched and managed to rescue from the floating wreckage 15 out of the crew of 24. However the seriously injured captain and mate subsequently died. The *Thorold* was one of the first victims of German air attacks off the Pembrokeshire coast in the Second World War. The area came into the effective range of bombers after the fall of France (Goddard 1983: 112-3).

9.2.89. The UKHO wreck number is 12010. The wreck is identified as being probably that of the *Thorold*. It was thought that another nearby UKHO wreck, number 11982, could be the ship, but that has now been discounted on the grounds that no wreck was found there in 1980 and rock outcrops encountered are likely to have previously been wrongly identified as a wreck.

9.2.90. The wreck has a least depth of 67m in a general depth of 77m. It was located by *HMS Hecate* in 1979. In 1980 it was resurveyed by *HMS Bulldog* and found to be 87.1m long by 17.8m beam, upright and lying 156/336 degrees with its bows to the north-west. Six holds but no masts were observed.

SS Philotis

9.2.91. *Philotis* (**2043**) was a steel screw steamship of the port of Liverpool built in 1926 in Troon by Ailsa S. B. Co. Ltd. and owned at the time of loss by the Moss Hutchison Line Ltd. With a gross tonnage of 880 and a net tonnage of 366, the vessel was 220.5ft (67.2m) long, 35.2ft (10.7m) in the beam and had a depth of 11.8ft. The ship was powered by three-cylinder triple expansion engines and had two steel boilers. Official number was 148737 and the ship was classified 100 A1 by Lloyd's.

9.2.92. On 3rd September 1940 the ship sank about eight miles north-west of the Saint Govan's Light Vessel off Pembrokeshire, whilst on passage from Swansea to Lisbon with a cargo of coal.

9.2.93. The UKHO wreck number is 11960 and is listed as probably the *Philotis*. It lies in territorial waters. Possibly located as early as 1950, it was found during a hydrographic survey in 1976. It was described as well broken up, with a north/south orientation and a least depth of 38m in a general depth of 49m. It was not found by a magnetometer search in 1978, although as this was only two years later, this was probably due to human error or inadequate or faulty equipment.

SS Maurita

9.2.94. *Maurita* (**2047**) was a small steel machinery aft single deck screw steamship of 199 gross tons. Owned by F. Gardner, the vessel was registered in the port of Lancaster. Built in Northwich, Cheshire by W.J. Yarwood & Sons Ltd. in 1920, the vessel had a length of 29.6m, a breadth of 6.9m and a depth of 2.9m. It was powered by a two-cylinder compound expansion engine producing 30hp, fed from a single boiler.

9.2.95. On 12th November 1941 the vessel appears to have hit a mine in the Hilbre Swash at the mouth of the River Dee and sank. It had been on passage for Lancaster, carrying a cargo of coal loaded at the Point of Ayr colliery. The crew of five was lost.

9.2.96. The UKHO wreck number is 7534. The wreck lies in territorial waters, but on the English side of the Dee. General depth is -2m and part of the wreck was visible at low water in 1941 and 1945. It may have been used for bombing practice by the RAF during the Second World War. It was last charted as a wreck in 1974 and deleted by UKHO in 1975. Its current status is 'dead'.

SS Clapham

9.2.97. *Clapham* (**2049/2050**) was a steel single deck screw steamship of the Port of London, with machinery aft and official number 113967. Gross tonnage was 763 and the vessel was 61.1m long; it had a breadth of 9.3m and a depth of 3.5m. The ship was powered by a three-cylinder triple expansion engine generating 116hp from a single boiler. It was built by S M'Knight & Co. Ltd. of Ayr in Scotland.

9.2.98. *Clapham* was lost as a result of a collision on 23rd July 1943 south of St Ann's Head, Pembrokeshire, whilst on passage from Cardiff to Belfast with a cargo of coal.

9.2.99. There are two UKHO wreck numbers for the *Clapham*, 11961 and 11962. The latter is now listed as 'dead' because nothing was found during hydrographic survey in 1977. 11961 was surveyed in 1977 and was approximately 60m long, lying at an orientation of approximately 030/210 degrees. It had a least depth of 48.2m in a

general depth of 50-52m. It is regarded as probably being the *Clapham*, although the possibility that it is a natural rock pinnacle cannot apparently be discounted.

PLM 21

9.2.100. *PLM 21* (**2051**) was a steel screw single deck steamer with machinery aft, requisitioned by the Admiralty for carrying coal to naval dockyards during the Second World War. French registered and owned, the ship had a gross tonnage of 5,417 tons and was 121.29m long, 17.06m in the beam and had a depth of 8.63m. *PLM 21* had four-cylinder quadruple expansion engines producing 529nhp and three boilers. It was built by Sir Raylton Dixon & Co. Ltd. in Middlesbrough in 1921. Whilst requisitioned, it was used to carry coal from Welsh ports to Admiralty dockyards.

9.2.101. *PLM 21* was lost on 3rd December 1944 when it went aground on the Middle Channel Rocks in Milford Haven and sank.

9.2.102. The wreck, UKHO number 12024, was initially buoyed and its masts and superstructure were visible at HW in 1951. Subsequently in the 1950s it was partly salvaged and dispersed. What was left was surveyed in 1972 and found to be lying, presumably well broken up, at 110/290 degrees, about 220ft (67m) long and with a least depth of 9.2m in a general depth of 11m. It lies in territorial waters.

SS Antonio

9.2.103. The *Antonio* (**2052**) was a single deck 5,225 gross ton steel screw steamship of the type AO Standard design, built by J. Thompson & Sons in Sunderland. Classed 100 A1 by Lloyds, the vessel was registered in London and owned by the Maritime Shipping & Trading Co. The ship was 121.99m long, 15.92m in breadth and had a depth of 8.63m. It had three boilers and three-cylinder triple expansion engines producing 517nhp.

9.2.104. On 28th March 1945 the ship collided with the *SS Fort Moose* off Milford Haven and capsized with loss of life. Three days later on 31st March the ship sank when about five miles off St Ann's Head, Pembrokeshire.

9.2.105. The UKHO wreck number is 11959 and the wreck lies in territorial waters. It was located during hydrographic survey in 1972. In 1976 *HMS Woodlark* reported that the wreck was 110m long and 95m wide, orientated 130/210 degrees, with a least depth of 37m in a general depth of 50m. The UKHO describe the wreck as being well broken up, which is consistent with the survey results.

SS Monte Gurugu

9.2.106. The *Monte Gurugu* (**2053**) was a 3,554 gross ton Spanish screw steamer built in 1921 in Bristol by C. Hill & Sons. With a length of 99.1m, breadth of 14.6m and depth of 7.6m, the vessel was powered by three-cylinder triple expansion engines and two boilers.

9.2.107. On 13th November 1949 the vessel was on passage for Genoa with a cargo of coal from Newport. Off Bull Point the huge seas produced by a north-westerly gale stove in one of its bow plates and the ship started to fill. Although the captain tried to run it ashore, the rudder failed and the ship foundered; 23 of the 24 crew were rescued by the Ilfracombe lifeboat.

9.2.108. The UKHO wreck number is 12225 and the wreck lies in territorial waters, albeit on the English side of the Bristol Channel, about 9.5km east of Lundy. It was located in 1949, when it was swept clear to 10 fathoms. In 2008 it was resurveyed by Fugro and was found to be 60.9m long and 24m wide, with a height of 5.4m and no scour. Orientation was 088/268 degrees, with the bows thought to lie to the east. UKHO describes it as intact, although this is at odds with the recorded length of the ship. Least depth is given as 42m in a general depth of 47m.

9.3. KNOWN WRECKS: VESSELS ASSOCIATED WITH THE COAL TRADE NOT CARRYING COAL AT THE TIME OF LOSS

9.3.1. It is apparent from the assessment of known losses carried out for this project that significant numbers of vessels associated with the maritime coal trade have been lost off Wales while not actually carrying coal.

9.3.2. Significant numbers of vessels have been traced that were bringing in goods needed by the collieries, for example pit props or 'pit wood' from France. Furthermore numerous vessels on passage to Welsh ports with bulk goods would almost certainly have loaded coal cargoes in Welsh ports. Some of these cargoes, such as iron ore from Spain and grain from a number of countries, were recognised 'coal out, ore/grain home' trades. Some of the coal ports, such as Barry, were so coal-dominated that it is unlikely that they would have been leaving with anything else. These are relatively easy to identify from secondary loss records without detailed research.

9.3.3. By no means all ships travelling to Welsh ports to pick up a cargo of coal would have been delivering a cargo to those ports. There is fairly frequent reference in loss records to vessels lost whilst in ballast. In the case of coal ports that handled very little in the way of other cargo, it is a reasonable assumption that they were to load coal on arrival. However in the case of ports that handled significant quantities of other export goods, such as Cardiff, this sort of assumption is unsafe and further research is required.

9.3.4. This assessment concerns itself with only those known wrecks that were carrying Welsh coal in the study area when lost. However the following example of a vessel known to have been on passage in ballast to a Welsh port in order to load coal is a useful example of the type of site that may be included in any further expanded study of coal trade wrecks.

SS Vendome

9.3.5. A significant number of known losses on passage to Welsh coal ports in ballast were almost certainly doing so in order to load a cargo of coal. The *Vendome* is a well-known example of this.

9.3.6. The *Vendome* was an iron screw steamer built in Sunderland in 1882. Registered at London, the ship was 155ft long by 23ft breadth. Rigged as a schooner and classed A1 at Lloyds, the *Vendome* was powered by two two cylinder compound steam engines fed by a single boiler. Combined power was 70 hp. At 480 tons and with a depth of only 13 feet, the build of the vessel was considered to be both light and shallow. Owned by Dancey and Robinson, ship owners of London, the vessel

appears to have been a typical tramp steamer used in the home trade and regularly carried Welsh coal.

9.3.7. On 4th December 1888 the *Vendome* was returning in water ballast to Neath having delivered a cargo of coal to Ramsey in the Isle of Man. Stormy weather had been encountered and the vessel had been forced to set trysails and work its way down St Georges Channel slowly. Arriving at Bardsey Island the master realised that the ship was further east than he had thought and therefore he attempted to work his way to the south and west.

9.3.8. The Bishop Light was spotted at about 04:15. Leaving instructions on the bridge, the master went below to consult his charts but fell asleep. The Boatswain, who was left in charge of the helm, lost sight of the light in rain at about 04:30. Failing to call the master, he sighted land dead ahead and put the helm hard over. However, the ship struck a glancing blow on a rock and then went onto other rocks with a heavier blow. The engines stopped and the vessel began to go down by the head and list heavily to starboard. With some difficulty the boats were got out and the entire crew of 11 abandoned ship as the *Vendome*, almost on its beam ends, drifted towards the land. Despite the fact that the vessel was obviously sinking fast, the master re-boarded it to try to save his papers. Although he was unsuccessful, he was able to get off before the ship finally sank in deep water at about 06:00.

9.3.9. The master was found to be responsible for the sinking at the subsequent Court of Enquiry. However due to his previous long service his ticket was only suspended for 3 months.

9.3.10. The *Vendome* appears to have sunk just a short distance from where it struck the second time, as the wreck lies in 28-35m at the foot of the reef at Tri Maen-trai, near Strumble Head, Pembrokeshire. The broken-up wreck is a popular recreational dive site and in 2005 was the subject of a 'Wreck Tour' article for *Diver* magazine written by John Liddiard and Kendall McDonald (http://www.celticdiving.co.uk). However, to date it does not appear to have been subject to any systematic survey.

9.3.11. The ship appears to have broken its back. The hull is reported to have largely collapsed, with plates and frames scattered over a wide area. An engine and the boiler survive together with the water tank, the four-bladed propeller and shaft and a large number of other features, including anchors, hatch combing, bollards and hawse pipes (http://www.celticdiving.co.uk/vendome.htm).

9.4. KNOWN WRECKS OUTSIDE THE STUDY AREA

9.4.1. Known wrecks outside the study area are not part of the scope of this assessment. However it is important to note that there are very significant numbers of known losses and wrecks that are known to have been carrying Welsh coal when lost, or to have carried Welsh coal at some point during their careers.

9.4.2. The following three examples of wrecks located outside of the study area give an indication of the potential.

SS Rosehill

9.4.3. The 1911 built and Cardiff-owned 2,788 gross ton screw steamer *SS Rosehill* was torpedoed on 23rd September 1917 (probably by *UB-40*) off Fowey, Cornwall. The ship was on passage at the time from Cardiff to the Admiralty base at Devonport, Plymouth with a cargo of coal. Initially abandoned, the vessel was re-boarded but attempts to run the vessel ashore on Kennack Sands before it sank failed.

9.4.4. The wreck lies upright on a sand and shale bottom in 26m of water (Larn 1996: 43 and D.Parham pers. comm.). The wreck is dived recreationally and an emergency steering standard and the stern gun are among artefacts known to have been salvaged from it.

SS Eastfield

9.4.5. The 1901-built and also Cardiff-owned 2,145 ton screw steamship *Eastfield* was on passage from Newport to Dieppe, France when it was torpedoed on 27th November 1917 by *UB-57* about seven miles east-south-east of Dodman Point, Cornwall.

9.4.6. The wreck lies in about 55m of water and as of the mid-1990s at least was partially intact with a height of about eight metres above the seabed. The orientation of the vessel was east-west. The bow, forward holds and bridge areas are largely intact, although the stern section has collapsed. The engine and two boilers survive. A stern gun lies in two pieces on the seabed, the result of a failed salvage attempt in 1972 (Larn 1997: no page no.). Richard Larn, the owner of the wreck in 1997, describes the cargo holds as being empty, but other sources suggest that a considerable quantity of coal is still present (D. Parham pers.omm.).

SS Bengrove

9.4.7. The 3,840 gross ton screw steamer *Bengrove* was built in 1910 in Stockton-on-Tees. After loading 5,850 tons of coal, the ship left Barry at about 04:00 on Sunday 7th March 1915 under sealed orders. The vessel was bound for France.

9.4.8. When about five miles north-north-east of Ilfracombe and steaming at nine knots, the *Bengrove* was hit by a torpedo fired by the submerged *U-20*. The ship started to settle and listed to starboard and was abandoned. Six of the 21 other steamers reported to have been in the area responded and all of the crew were safely picked up. After half an hour the *Bengrove* sank, in full view of a large crowd gathered on the Ilfracombe shore.

9.4.9. The wreck currently lies in a general depth of 31m, orientated 40/220 degrees. It is partially intact with a least depth of 24m.

10. DISTRIBUTION OF KNOWN LOSSES AND WRECKS: ENVIRONMENTAL AND HISTORICAL FACTORS

10.1. SAILING VESSELS

10.1.1. Of the 472 sailing vessel losses traced during the course of this assessment, 234 or almost 50% were stranded. Another 152, or 32%, foundered or disappeared, presumed foundered. A total of 47, almost 10%, were lost as a result of collisions, but only 8, less than 2%, to enemy action during the 1914-18 and 1939-45 wars.

10.1.2. The latter figure almost certainly reflects the lack of sailing vessels employed in the coal trade in the 20th century, rather than any inherent invulnerability or lack of attractiveness as targets. The dominance of stranding in these statistics is largely due to the vulnerability of wind-powered vessels to adverse winds, particularly in the narrow confines of the Bristol Channel.

10.1.3. **Figure 5** shows the distribution of known sailing vessels losses that were caused by stranding, foundering or collision. Not unsurprisingly there are concentrations of collisions in the confines of the upper Bristol Channel and Severn Estuary, where navigation was constrained into relatively narrow and busy channels and also off Pembrokeshire, where a busy shipping route skirts the coast. There is a noticeable absence of collision casualties from North and West Wales, probably reflecting the relatively low volumes of the North Wales coal trade.

10.1.4. Strandings show a more even distribution around the Welsh coast, but again there is a noticeable concentration along the South Wales coast. This reflects the lack of safe anchorages and the vulnerability of sailing vessels on passage in the narrow and shallow confines of the Bristol Channel to gales and the sheer volume of traffic using the South Wales ports. Analysis of the known loss records suggest that the majority of strandings were weather related and that casualties were caused by gales blowing from all directions, but that north-westerlies, westerlies and south-westerlies were most likely to cause mischief. They also suggest that the requirement for vessels to wait outside the busy southern coal ports, often in close proximity to dangerous sandbanks or reefs, contributed to the scale of the casualties.

10.1.5. Casualties that foundered are more widely distributed, although there is again a concentration in and in the approaches to the Bristol Channel, reflecting the volumes of traffic calling at South Wales ports. Not unsurprisingly they dominate losses offshore and outside of territorial waters.

10.2. STEAMSHIPS

10.2.1. Of the 100 known losses of steamships for which cause of loss has been traced, the most common cause of loss was foundering which was responsible for 33% of sinkings. Enemy action during the wars of 1914-18 and 1939-45 is the second most common cause of loss, with strandings and collisions responsible for 22% and 19% respectively.

10.2.2. Collisions and founderings have a broadly similar distribution to sailing vessels (**Figure 6**). The noticeable concentration of collisions in the Bristol Channel reflects the same environmental and historical factors.

10.2.3. Strandings are also similar, with the exception that they are absent from the North Wales coast east of Anglesey. This suggests that steamships were less vulnerable to strandings in this area, although it is not entirely clear why this would be the case. Steamships seem to have been noticeably less vulnerable to stranding than sailing ships, due to their wind-independent means of propulsion.

10.2.4. Enemy action, which claimed a far higher proportion of steamship casualties, also has a broadly similar distribution to those losses of sailing vessels caused by enemy action, with a concentration off South and West Wales reflecting the density of

maritime traffic in these areas. Relatively few of these losses occur close inshore, reflecting the relative vulnerability of submarines in these areas.

10.2.5. Amongst the UKHO wrecks traced within the study area, 47% of losses were caused by enemy action, about 23% by foundering and about 18% and 12% by collisions and strandings respectively. The greater significance of enemy action amongst charted wrecks is probably due to their generally later date and the greater size and degree of survival of such wrecks. There were often survivors from such wrecks and this probably resulted in greater accuracy in loss positions, particularly offshore.

10.3. ABSTRACTS OF SHIPPING CASUALTY RETURNS

10.3.1. The abstracts of returns made to the Board of Trade of shipping casualties in the second half of the 19th century and the early 20th century record loss locations in terms of the number of the number of strandings that occurred at named locations, for example Lynch Sand, Burry River or Tusker Rock, Glamorgan. Analysis of these records for the period 1859-1879 and 1892-1902, focussing on the Welsh coast and the Bristol Channel, suggests that the following locations were the most dangerous navigational hazards for shipping (excluding trawlers) using Welsh ports:

Hazard	Number of strandings
Nash Sand, Glamorgan	37
Goodwick Sands, Pembrokeshire	27
Cardiff Sands, Glamorgan	25
Lavan Sands, Caernarfonshire	25
Wolves Rocks, Bristol Channel	25
Scarweather Sands, Glamorgan	22
Platters Rocks, Holyhead Harbour	18
Platters Rocks, Skerries, Anglesey	18
Dulas Island, Anglesey	16
Bishop and Clerks' Rocks, Pembrokeshire	15
Sully Island, Glamorganshire	15

10.3.2. Interpretation of these statistics is not straightforward. The cause of the stranding (navigational error, weather or vessel breakdown) is not given. Furthermore, neither the type of vessel lost, i.e. steamship or sailing vessel, nor the cargo carried is given. Given that the method of propulsion is not stated, it is difficult to know how far these results can be applied to the pre-steamship era or to the 20th century. Nevertheless it may reasonably be surmised that the above locations, with the possible exception of Platters Rocks, Holyhead Harbour, constituted the main inshore navigational hazards for the maritime coal trade of Wales.

10.3.3. Analysis of contemporary records as compiled for the Board of Trade (**Appendix IV**) suggests that harbour and river environments were hazardous places and that strandings and collisions occurred there very frequently. Analysis of a sample year, ending June 1902, suggests that harbour and river environments posed a substantial threat to both sailing and steam-powered vessels. For example in Cardiff there were casualty incidents on average every 6-7 days. However the total loss of a vessel was a highly unusual outcome (only one of every 72 vessels involved) and fatalities rarely resulted.

10.3.4. Cardiff, Barry and Newport appear to have been particularly hazardous places, accounting for most of the casualties. Surprisingly Swansea, despite also being a very busy port, does not appear to have been quite as dangerous.

11. COAL-CARRYING MERCHANT SHIPS IN USE OR PRESERVATION, RECONSTRUCTIONS AND HULKS

11.1.1. No examples of preserved or hulked ocean-going steamships involved in the Welsh coal trade have been traced during the course of this assessment. No reconstructions of this type of vessel are believed to have been built.

11.1.2. A comprehensive account of this category of vessel would be well beyond the limited scope of this assessment. The following discussion is therefore intended to highlight examples of surviving vessels or hulks that may have particular significance for the assessment.

11.1.3. A number of vessels are listed below that have achieved iconic status for reasons largely unconnected with their use as colliers. These include Brunel's internationally important *SS Great Britain*.

Great Britain

11.1.4. Although built as a transatlantic liner, the *Great Britain* worked as a coal-carrying merchant ship between 1882 and 1886 and carried Welsh coal to the USA. The vessel is now dry- docked and is preserved as an award-winning museum. It is listed in the Core Collection of the National Register of Historic Vessels (NRHV 76).

11.1.5. Launched in 1843, Brunel's *Great Britain* was a revolutionary iron-hulled screw steamship, the first ocean-going screw driven vessel. In 1882 the ship, its transatlantic career being long behind it, had its engines removed and it was re-rigged as a three-masted fully rigged sailing ship. As such the *Great Britain* made a number of voyages to San Francisco carrying South Wales coal and returning with grain.

11.1.6. In February 1886 the *Great Britain* left Penarth with coal bound for the west coast of South America. Rounding Cape Horn, it ran into a hurricane. It was partially de-masted, sprang several leaks and, most seriously, the cargo shifted. The vessel was forced to turn around and make a run to the Falkland Islands. It ran aground there but was refloated and towed into Port Stanley. There it was effectively abandoned and used as a hulk until 1970 when it was brought back to the port where it was built, Bristol, and subsequently restored.

11.1.7. In terms of the Welsh coal trade the *Great Britain* is significant in being a rare example of a preserved foreign-going sailing vessel that regularly carried Welsh coal. This status is enhanced by the fame of the vessel generally and its association with the United Kingdom's most famous engineer.

Jhelum

11.1.8. Built in Liverpool by Joseph Steel & Son in 1849, the *Jhelum* was a 466 ton wooden sailing ship. Initially fully rigged, it was converted in the mid 1850s to a barque rig. The vessel was 118.5ft long by 24.6ft breadth and had a depth of hold of 17.1ft (Stammers et al. 1992). For most of its career the ship was engaged in the copper and

guano trade with the west coast of South America, exporting coal outbound. Between 1863 and 1869 it came into the ownership of William Widdecombe, a shipowner of Cardiff and later Liverpool (Stammers 1985: 120).

11.1.9. The *Jhelum's* last voyage was in 1869, when it carried a cargo of coal loaded at Cardiff and bound for Montevideo. The ship was forced to put into Rio where many of the crew deserted. Although the ship discharged its cargo at Montevideo and was prepared to sail in ballast for Callao to load guano, it had been damaged in a storm and the crew refused to sail unless the vessel was surveyed. It passed the survey, but homewardbound from Callao in 1870 the *Jhelum* was forced by stress of weather to put into Port Stanley in the Falkland Islands where the ship and its crew were effectively abandoned by Mr Widdecombe.

11.1.10. The *Jhelum* was purchased locally by Dean & Co and scuttled to serve as a jetty head and workshop area. The hulk has also been used for storage. Its condition deteriorated and in 1987-90 stabilisation and recording work was carried out by the Merseyside Maritime Museum and local interests including the Falkland Islands Museum and National Trust. Although the ship is regarded as being a very important part of the local historic environment, it continues to deteriorate and its long term prospects appear to be poor. A serious infestation of shipworm was discovered in 2002. This may be linked to an increase in the amount of sewage discharged into the waters around Port Stanley (http://www.liverpoolmuseums.org.uk/nof/top/shipworm.html).

11.1.11. The *Jhelum* is important on three counts. Firstly it is a rare survival of a typical foreign-going merchant sailing vessel that routinely carried Welsh coal. To quote Mike Stammers, John Keagan and John Kearon, it is 'a ship that deserves to be famous for being ordinary' (http://www.falklands-museum.com/html/maritime/jhelum.htm). Secondly it is considered to be a very important part of the historic landscape of the Falkland Islands. Thirdly, it is the only non-wreck example of a Liverpool-built 19th century merchant ship (http://www.liverpoolmuseums.org.uk/nof/top/shipworm.html).

Robin

11.1.12. The steamship *Robin* is the only restored example of a British steam coaster of the late 1800s and is known to have been engaged in the Welsh coal trade in the 1890s. Although it is no longer sailed under its own power or worked as a cargo carrier, it remains afloat and is preserved for static educational use. It is listed in the Core Collection of the National Register of Historic Vessels (NRHV 1794).

11.1.13. The *Robin* is a traditional raised quarterdeck coastal screw cargo steamer. It was built in 1890 by Mackenzie, MacAlpine & Company at their Orchard House Yard in Blackwall, London. The boiler and triple-expansion main engines were subsequently built and fitted by Gourlay Bros. & Co. in Dundee (http://www.ssrobin.com/heritage.php). Length overall was 43.59m, breadth 6.71m and draught 3.96m. Gross tonnage was 366 and the vessel was schooner-rigged.

11.1.14. The *Robin's* owners on delivery were Arthur Cornwallis Ponsonby and Isaac Crocker of Newport. Maiden voyage was from Liverpool to Swansea via Bayonne in France. From then until 1900 the vessel was engaged in the Home Trade and is known to have visited more than 140 ports. Many of the cargoes carried by the *Robin* were of

Welsh coal. In 1892 the *Robin* was bought by Alexander Blackwater to form the Robin Steamship Company (http://www.ssrobin.com/heritage.php?case=Heritage).

11.1.15. In 1900 the vessel was sold to Spanish interests. From then until 1974 the *Robin*, renamed *Maria*, was engaged in the Spanish coastal trade, normally carrying bulk cargoes including coal.

11.1.16. In 1974 the vessel was bought by the Maritime Trust and restored. With the demise of that collection, a trust was formed to safeguard the *Robin's* future and it has recently been used as a community education resource centre. Substantial funding has been obtained and the vessel is currently undergoing structural conservation in dry dock in Lowestoft. It will be returned to London in 2009. The Robin Trust hopes that the vessel will subsequently be preserved as a learning and heritage centre (http://www.ssrobin.com/heritage.php?case=Heritage).

Kathleen and May

11.1.17. Remarkably, a Welsh-built coastal sailing collier also survives. The *Kathleen and May* (**Plate 5**) is a three-masted topsail schooner launched in April 1900 by Ferguson and Baird at Connah's Quay. This wooden vessel is 29.97m in length, with a breadth of 7.06m and a draught of 3.07m. Gross tonnage is 136. It is listed in the Core Collection of the National Register of Historic Vessels. It is still seaworthy and is still capable of carrying commercial cargoes.

11.1.18. Built for Captain John Coppack and originally named *Lizzie May* after his two daughters, the schooner's maiden voyage was from her home port to Kent. She loaded cement and sailed to Plymouth. It sailed from there with pitch to Cardiff, where it was loaded with coal. During the next few years the *Lizzie May* was employed transporting bulk cargoes including coal, cement, pitch and clay to ports between Scotland and the Channel Islands.

11.1.19. In September 1908 the ship was purchased by M.J. Fleming of Youghal, Ireland and renamed *Katherine and May*. In October the vessel ran aground on the Goodwin Sands whilst on passage from London to Newport loaded with cement. Refloated the vessel was taken into Dover and unloaded, before leaving in ballast for Milford. Encountering heavy weather off Lundy, the schooner ran for shelter in Penarth Roads.

11.1.20. The schooner was then placed in the coal trade between the South Wales coal ports and its Irish base under Captain Joe Aherne of Youghal. Oats or pit props were carried outbound, with coal inbound to Youghal. The vessel continued in this trade until April 1931 when it brought 202 tons of coal from Cardiff, its last voyage under sail alone.

11.1.21. Later in 1931 the schooner was purchased by Captain Tommy Jewell and his father William, well-known coasting skippers from Appledore in England. In order to compete with motor vessels, the *Katherine and May* was fitted with a Beardmore 80-horsepower auxiliary engine. The refit also saw its topmasts shortened and top sails taken down.

11.1.22. The Jewells also operated the vessel in the South Wales-Youghal coal trade between 1931 and 1939, as well as in trade with various small West Cork harbours, including

Courtmacsherry and Castletownend. During the Second World War the *Katherine and May* continued to operate under the Jewells' ownership in the Irish coal trade and was also used to ship china clay from Fremington on the north coast of Barnstaple to Crosshaven, County Cork for the famous pottery at Carrigaline. During the war the vessel was armed with a Lewis machine gun and a rifle. In July 1943 a new 125hp Deutz engine was fitted.

11.1.23. The vessel continued to trade actively in the post-war years and in 1952 a new 135bhp Crossley diesel engine was fitted. The vessel was a common sight in Cardiff and Appledore and in 1959 traded between Avonmouth and Pembroke.

11.1.24. In 1960 the vessel was still involved in transporting china clay to Fremlington. However Bristol Channel freights were becoming very difficult to obtain and in 1960, whilst still under the command of the 65 year old Tom Jewell, the vessel ceased trading commercially. Fittingly the last commercial cargo was coal, from South Wales to Par in Cornwall.

11.1.25. In the 1960s the vessel went through various changes in ownership but plans to reuse it came to nought and it was laid up in various ports. In 1970 the vessel was purchased by the newly- formed Maritime Trust and fully restored to its original topsail schooner rig. Exhibited in Plymouth for a number of years, it was eventually moved to St Katherine Dock where it formed part of the Maritime Trust's collection.

11.1.26. Moved to Southwark after the dispersal of the Maritime Trust's fleet, the vessel is currently in private ownership and for sale. Recently the owner has taken advantage of high shipping rates to return the vessel to active commercial use, transporting bottled wine in bulk from France to Britain. It is not known whether this high-profile endeavour is likely to continue and the future of the *Katherine and May* appears to remain uncertain.

11.1.27. *Katherine and May* is a surviving sailing vessel that spent much of its working life involved in the Welsh coal trade. Although it spent much of its working life in the twilight of the merchant sailing ship, it has been restored to its original or near-original condition and is seaworthy. It is still capable, at least theoretically, of commercial usage. As such it is, along with the *Robin*, arguably the most important surviving non-documentary artefact of the Welsh coal trade. Given the importance of the coal trade to the modern history of Wales, its preservation and, if possible, public access to it, must be considered a matter of priority for Welsh heritage curators.

Garlandstone

11.1.28. The *Kathleen and May* is not however the last sailing vessel that regularly carried Welsh coal in existence. The *Garlandstone* is a two-masted ketch built on speculation between 1904 and 1909 by James Goss on the River Tamar, Devon. It is listed as a Designated Vessel by the National Register of Historic Vessels (NRHV 136).

11.1.29. This wooden vessel is 23.16m in length, with a breadth of 6.16m and a draught of 2.74m. Gross tonnage is 75. It is listed as a Designated Vessel in the National Register of Historic Vessels. It is a floating museum exhibit. The vessel has the distinction of being the last but one wooden merchant sailing vessel to be built in southern England (NRHV 136).

11.1.30. Purchased by a Captain Russan and registered in his home port of Milford Haven, the *Garlandstone* was capable of carrying about 100 tons of cargo. Unusually Captain Russan had the vessel fitted with a 40hp auxiliary engine which could push it along at up to 6 knots (http://www.swmaritime.org.uk). This gave him a considerable commercial advantage in the coastal trade. The vessel appears to have regularly carried Welsh coal outbound, frequently to Ireland. During the First World War it was used to transport Pembrokeshire coal from the Hook Colliery to France for the armed forces (http://www.swmaritime.org.uk).

11.1.31. Captain Russan sold the vessel in 1920. It continued in the Irish trade under a variety of owners and was re-engined and had its sail area reduced during the Second World War. In 1946 it was sold to an American and its British register was closed. Although it had been intended to convert the *Garlandstone* into a yacht, these plans came to nothing and it was laid up for a long time in Barmouth, before being rescued and towed to Porthmadog, where it was eventually absorbed into the collection of the Gwynedd Maritime Museum. It was eventually purchased by the National Museum of Wales (NRHV 136).

11.1.32. *Garlandstone* is currently on long-term loan as a floating exhibit to the museum at Morwellham Quay on the River Tamar in Devon.

Glenlee

11.1.33. In addition to coastal sailing vessels, there are well-preserved examples of ocean-going sailing vessels that had some involvement in the coal trade, such as the Clyde-built three- masted barque *Glenlee*.

11.1.34. Built in 1896, the *Glenlee* circumnavigated the globe four times and survived Cape Horn 15 times. It was renamed *Islamount* on 9 September 1899. In September 1905 the ship was bought by R. Thomas & Co. of Criccieth and Liverpool, who put her into a single ship company (the Flint Castle Ship Co.) under the command of a Welsh master.

11.1.35. As *Islamount*, the ship carried cargoes of Welsh coal on three occasions. In October 1899 it loaded a cargo of coal at Cardiff for Adelaide, returning with wheat for Limerick. In April/May 1907 it loaded coal at Barry for Chile and returned with nitrates for Antwerp. In November 1908 it loaded coal again at Barry for Callao. It returned from Chile with a cargo of nitrates bound for Rotterdam.

11.1.36. The 1907 voyage proved to be eventful. Off Montevideo the crew complained that the cargo was heating and refused to proceed. Overheating of coal cargoes was not uncommon and the crew may have been required to abandon ship if a fire had broken out. However, the ensuing altercation with the master appears to have been distracting, as the ship ran aground on a reef. Subsequently it was towed into Montevideo and the cargo was partly unloaded.

Balclutha

11.1.37. The *Balclutha* is a steel hulled three-masted fully rigged ship built in 1886 on the Clyde. Overall length is 92m. With a beam of 11.8m and a draught of 6.2m, the ship has a gross tonnage of 1,689 and a displacement of about 4,100 tons (http://www.nps.gov/safr /historyculture/balclutha.htm).

11.1.38. British-registered, the ship's maiden voyage was from Penarth to San Francisco, loaded with 2,650 tons of Welsh coal. On the return voyage the *Balclutha* carried Californian wheat (http://www.nps.gov/safr/historyculture/balclutha.htm).

11.1.39. In its first 13 years the ship rounded Cape Horn 17 times. Coal was only one of a number of cargoes carried. From 1899 to 1954 the ship appears to have been employed full time in the Pacific Coast lumber and other trades.

11.1.40. It was purchased in 1954 by the San Francisco Maritime Museum and restored. Transferred to the U.S. National Parks Service in 1978, the *Balaclutha* was designated a National Historic Landmark in 1985.

Result

11.1.41. The *Result* was built as a three-masted steel hulled topsail schooner in 1892-3 by Robert Kent & Company in Carrickfergus, Northern Ireland. Much admired by contemporary schooner captains for its speed and cargo carrying capacity, the *Result* has been described as the finest small sailing vessel built in Britain (http://www.mightyseas.co.uk/ marhist/furness/ashburners/result.htm). It is listed as being part of the Core Collection by the National Register of Historic Vessels (NRHV 496).

11.1.42. Length overall is 31.09m. The vessel has a beam of 6.61m and a draught of 2.29m. Gross tonnage is 122 (NRHV 496).

11.1.43. The *Result* was initially owned by Thomas Ashburner & Co. and registered at Barrow. Purchased in 1909 by Henry Clarke, the schooner became part of the large fleet of coastal sailing vessels operating out of Braunton in North Devon (http://www.mightyseas.co.uk/ marhist/furness/ashburners/result.htm). Operated in the home trade, it is likely that the *Result* was a regular carrier of Welsh coal.

11.1.44. The schooner was re-rigged as a ketch and fitted with an auxiliary 45bhp engine in 1914, which allowed it to motor at up to 5 knots when fully loaded (http://www.mightyseas.co.uk/ marhist/furness/ashburners/result.htm). This allowed its owners to compete on more favourable terms with the coastal steamships and Dutch motor vessels that were beginning to have a serious impact upon the profitability of coastal sail. The vessel was re-rigged a number of times during its career to suit the particular trades that it was engaged in. This was not unusual for sailing coasters, which had to balance the advantages of sails in fuel economy against the costs of additional maintenance and extra crew.

11.1.45. The *Result* had an interesting war. Frequent attacks were made by German submarines on schooners and other sailing vessels carrying coal coastwise and losses, particularly amongst sailing vessels became heavy. For example the schooner *Ellen Harrison* was sunk near Cherbourg in 1917 whilst carrying coal from Cardiff. The schooner *Louise Bell* was also lost nearby nine months later whilst returning to Cardiff. As a result the Royal Navy decided to experiment with Q-ships. Consequently the *Result* was armed as Q-23.

11.1.46. Armed with guns and torpedoes, the disguised *Result* appears to have damaged the *UC-45* in March 1917 but did not sink her. A second encounter with a U-boat in April proved to be less successful and the vessel suffered serious damage from its

more heavily-armed opponent. The vessel was generally unsatisfactory as a Q-ship and in August it became the cargo-carrying *Result* once again.

11.1.47. In the inter-war years the ship was operated in the slate trade out of Porthmadog to Antwerp and other continental ports and then in the short sea trade along the south coast of England. The *Result* spent the Second World War in the Bristol Channel trade carrying coal from the South Wales ports (http://www.mightyseas.co.uk/ marhist/furness/ashburners/result.htm).

11.1.48. In post-war times the *Result* continued in the Welsh coal trade. It was refitted with a more powerful engine of 120hp. Despite this it was rigged as a topsail schooner and, uniquely at that time, retained a full sail plan. On one occasion the vessel was almost lost as a result of overloading and the owner's son, Captain Peter Welch, had to run the vessel ashore near Ilfracombe in order to save it (http://www.mightyseas.co.uk/ marhist/furness/ ashburners/result.htm).

11.1.49. By the beginning of the 1950s the ship's owners were having difficulty in obtaining enough work for the vessel and it was frequently laid up. Some unusual work was obtained and the *Result* starred in the film adaptation of Joseph Conrad's 'Outcast of the Isles'. Ralph Richardson and Trevor Howard were both filmed onboard (http://www.mightyseas.co.uk/ marhist/furness/ashburners/result.htm).

11.1.50. During this period the mainmast was removed and the *Result* became a ketch-rigged motorship. By 1967 cargoes were increasingly scarce and following the death onboard of the elderly Captain Welch the vessel was laid up in Exeter, where the Exeter Maritime Museum attempted to keep it in reasonable order.

11.1.51. In 1970 the *Result* was sold to the Ulster Folk and Transport Museum. It was partly restored by Harland & Wolff but the resources were not available to restore the original three-masted rig (http://www.mightyseas.co.uk/ marhist/furness/ashburners/result.htm). Lifted out of the water, the vessel remains at the museum as a static exhibit.

Bessie Ellen

11.1.52. The *Bessie Ellen* is one of the last surviving two-masted wooden West Country trading ketches from a fleet that once numbered nearly 700 vessels. It is listed as being a Registered Vessel by the National Register of Historic Vessels (NRHV 1850).

11.1.53. Built in Plymouth in 1904 by the yard of William Kelly, the *Bessie Ellen* has a length overall of 36.5m, a beam of 6m and a draught of 3m (http://www.bessie-ellen.com/). Gross tonnage is 87.

11.1.54. The vessel was bought off the stocks by Captain John Chichester, a North Devon home trade captain, and was employed coastwise carrying bulk cargoes such as peat and clay. Having gone aground on the Morte Stone in 1910, the *Bessie Ellen* was salvaged and then repaired in Appledore (NRHV 1850).

11.1.55. A 25hp Widdop engine was fitted in 1916 in order to increase the vessel's competitiveness and it was subsequently worked in the coal trade between Newport and Appledore and Lyme Regis. It continued in this trade until 1947 when the vessel

was purchased by a Danish owner for use in the Baltic scrap iron trade. The *Bessie Ellen* operated in this trade until the 1970s when its small cargo carrying capacity rendered it unprofitable (NRHV 1850).

11.1.56. The vessel was then laid up for 20 years before being purchased in 2000 and subsequently restored to its original sailing rig. It is currently used as a cruising charter boat (http://www.bessie-ellen.com/).

12. ARTEFACTUAL AND DOCUMENTARY EVIDENCE

Museums, Galleries and Public Record Offices

12.1.1. An assessment of the relevant material in the collections of museums and galleries in both Wales and more widely would be a lengthy exercise and is beyond the scope of this assessment. Considerable quantities of material are likely to exist. For example the collection of the National Waterfront Museum in Swansea includes ship models, paintings and an extensive collection of relevant photographs. The National Maritime Museum in Greenwich is also likely to hold a number of relevant plans and other images together possibly with ship models and other artefacts.

12.1.2. A wide variety of public archives were also contacted during the course of this assessment, including all the record offices for counties bordering the Welsh coast. It became apparent that the amount of material held that had at least some relevance to the maritime aspects of the Welsh coal trade was very large indeed and that fully assessing these holdings would have been extremely time-consuming and beyond the scope of this study. Although on-line catalogues are quite generally available, it is likely much of the original material will need to be examined in order for such an assessment to produce a genuinely useful result.

Previous Archaeological Investigations

12.1.3. WA has been unable to trace any published archaeological survey or excavation of the wreck of a ship carrying Welsh coal. However, 'Wreck Tour 123: The Musgrave' published in *Diver* Magazine (Liddiard et al. 2009) satisfies most of the requirements of WA recording levels 1a and 1b (**Appendix VI**).

Other Salvage

12.1.4. Salvage shortly after loss is frequently referred to in known loss records, particularly for strandings. WA is unaware of any salvage operations that have taken place in recent years.

Private Collections and Archives

12.1.5. Private collections of artefacts recovered from relevant wrecks certainly exist. Whilst it has not proved possible within the context of currently available project time to fully investigate the extent of these collections, information has been obtained from H.M. Receiver of Wreck with regard to material reported under the droit system. The following material is recorded as having been recovered from the wrecks discussed in section 9:

Wreck	Droit No.	Recovered material
Elizabeth Alice	A/0147	2 x keel bolts, brass, 3' long, twisted (2kg each)

Ethel	347/07	1 x ship's bell, inscribed: SS Ethel, 1878, Stockton

12.1.6. Significant quantities of material have been reported as recovered from positions in the general vicinity of other listed wrecks. However due to the very variable positional quality that is often given for recoveries, it is not possible to confirm whether any of this material comes from the wrecks.

12.1.7. Private documentary archives with relevant information also almost certainly exist. This type of archive can be broadly divided into three categories:

- Archives of material accumulated by maritime historians for the purposes of research. This will include both data and material that has not been published and that published in a temporary format, such as a web-site. It will include photographic collections, document collections and research notes. This category also includes data that has been collated solely by memory. Some of this material may have a lifespan limited to the collator's lifetime.
- Archives of material accumulated by avocational divers. This may include positions, photographs, video, dive logs and miscellaneous site descriptions, together with research notes collated for the preparation of dive guides. It may also include material collated for the purposes of historical and archaeological research that has not yet been published.
- Archives of material collated by those involved in the coal trade and their families and friends. This may include log books, photographs and other pictures, diaries, mementoes, personal effects and other items. It also includes oral history, in the form of recollections by those involved or those they talked to.

13. DISCUSSION AND RECOMMENDATIONS

13.1.1. The Welsh coal industry was once the UK's largest single export industry and was arguably the most important single economic factor, except perhaps for agriculture, in shaping modern Welsh history and society and its perception abroad. It may therefore be argued, with some justification, that the coal industry should be regarded as one of the most important subjects for Welsh archaeology.

13.1.2. The coal trade was largely an export trade, in that most of the coal produced was intended for markets outside the producing areas, either in the wider UK, Europe or further afield. Coal was a bulk commodity and the limitations of land transport and the fact that much of the market was foreign meant that sea transport was central to the trade.

13.1.3. Despite this, archaeology has done little to illuminate the coal trade. Indeed it may reasonably be said that, at least in terms of the coal ships, archaeology has ignored the coal trade altogether. In terms of the study of shipwrecks, the archaeological research that has been carried out in Wales has tended to focus largely upon the non-thematic assessment of vessels from earlier periods that were not carrying coal.

13.1.4. Although very few wreck sites associated with the Welsh coal trade are known, several hundred vessels that were carrying Welsh coal have been lost in territorial or near territorial waters bordering the coast of Wales during the last two hundred years, together with an unknown number of wrecks from earlier periods. Therefore the potential exists for there to be a large number of extant but currently unknown wreck sites associated with the Welsh coal trade around the coast of Wales.

13.1.5. This assessment has also demonstrated that a considerable amount of information about these sites exists in a wide variety of sources. Because many of the vessels were lost during the 20th century, the potential for evidence from sources that are not normally relevant to archaeologists, such as oral history, exists. The existence of a number of preserved vessels associated with the coal trade is also extremely important, offering a rare opportunity for the study of both shipwrecks and preserved ships to be synchronised.

13.1.6. This resource may be seen as a group of sites that constitute both monuments and research opportunities. In terms of the latter, little if any work appears to have been done to establish an archaeological research agenda, i.e. what these sites may tell us that we do not already know. This is particularly important for wrecks of relatively modern vessels for which documentation of various types, including plans and photographs, and preserved examples may also exist. Marine archaeologists have traditionally eschewed the investigation of wrecks of the later 19th and 20th century, partly due to the perception that their age or relative numbers compared to vessels of earlier periods inevitably make them less important and therefore less deserving of archaeological study, and partly due to the perception that we can establish all we need to know about them without archaeological investigation. These attitudes are now changing and it is gradually becoming appreciated that archaeological study of wrecks of the modern period is not just justifiable but in some cases also necessary and probably urgent.

13.1.7. In terms of monuments, little is known about the current condition of most of them. Little is known either about how finite a resource coal ship wrecks are in terms of how long they will effectively exist as extant monuments. As wrecks they are subject to a marine environment that is often hostile to preservation. In particular the 'lifespan' of metal wrecks on the seabed is poorly understood, although it is anecdotally appreciated that most metal wrecks of the 19th and early 20th centuries are sufficiently old to be in an advanced state of collapse.

13.1.8. This study goes some way to filling a gap in our understanding of Welsh maritime and industrial history in that no previous archaeological study of the Welsh coal trade, on either an individual site or a thematic level, has previously been published. WA recommends that the following steps should be taken in order to build on it:

- The publication and dissemination of the results of this assessment through RCAHMW, the WA website, the media (including the diving press) and a journal publication such as *Maritime Wales*. This will involve the production of a range of material, including a non-technical report suitable for a range of audiences and a teaching pack.
- Collation and publication of a catalogue of material relevant to the maritime coal trade held in the collections of museums, galleries and public archives in Wales and in the wider UK.

- An outreach project aimed at establishing the extent of and cataloguing material and information held by private individuals and organisations. This may include, for example, information held by avocational divers and the recording of oral history.
- An outreach project aimed at promoting awareness across all sectors of Welsh society of the importance of the Welsh coal trade in the development of both modern Wales and the UK, to include the preparation of national curriculum teaching packs and the involvement of the media in any archaeological investigations
- An archaeological investigation of a sample wreck site from Section 9. This work should also aim to produce a full account of the history of the ship, its owners and crew, ports of call and cargoes and should attempt to trace and involve those people or their living relatives. The *Musgrave* is suggested as being a suitable example as it is readily accessible and has an existing public profile as a recreational dive site. Ideally this work will be undertaken with the co-operation and involvement of the recreational diving and local communities. The aim would be to establish how the archaeological study of this type of site can best add to our understanding of the Welsh coal trade; help promote the importance of Welsh industrial and maritime history to a diverse range of audiences; produce educational and media content for a modern audience; and promote tourism, for example by using archaeological results to enhance recreational diving usage.
- An archaeological investigation of sample areas of seabed, combining geophysical and diver survey, together with detailed archival research of selected known losses. The aim of this work would be to establish whether the current disparity between the numbers of known losses and known wrecks can be successfully addressed through archaeological fieldwork combined with desk-based assessment.

14. ARCHIVE

14.1.1. The project archive consisting of a GIS work space and linked shape and other files, miscellaneous digital files and hardcopy documents, are currently stored at WA under project code 53111.

15. GLOSSARY

Anthracite coal: A non-bituminous, hard, black coal. Almost entirely composed of carbon (over 93% in the South Wales Coalfield), it burns slowly with an intense heat that yields very little ash or smoke. Although it is more difficult to light, these qualities and its comparative rarity compared to other types of coal meant that it was relatively expensive. Anthracite coals tend to occur in lower measures than bituminous coals. Their characteristics are the result of bituminous coals being transformed by being gradually buried at greater depths or under hotter conditions. This tends to drive off the gaseous and liquid components, leaving a coal with a higher proportion of carbon.

Bituminous coal: A coal that contains a high proportion of volatile hydrocarbons. Most British coal is bituminous. Carbon content varies from 75-95% (84-91% in the

South Wales Coalfield) and hydrogen 1.5-5.7%. Bituminous coal is subdivided into caking and non-caking varieties. Softer caking coals have been used for making town or coal gas and coke, and for raising steam in boilers. Harder non-caking coals (also known as splint coals) have been used for domestic fuel.

Bunker coal: Coal used by steamships as fuel. The compartments used to store coal were called bunkers and the loading process bunkering. From this was derived the expression 'bunker coal' or 'bunkers'.

Coastal and export trade: For the purposes of this document, coastal trade means trade around the coast of mainland Britain. Export means overseas trade and includes Ireland.

Coastwise: Coastal.

Collier: Although the term 'collier' is often used incorrectly to describe any vessel that carried coal in bulk, the term in fact describes a specific type of coal-carrying vessel, one that was totally dedicated to the coal trade. Most ships that carried Welsh coal cargoes were not colliers, in that they also routinely carried other cargoes, for example iron ore or grain.

Culm: Coal dust or slack, also known as calum. Often used to fuel lime kilns and malt drying kilns. Alternatively small coal; in South Wales culm was the name given to small coal of anthracite.

Home trade: British flagged vessels trading between ports within the 'home trade limits' required a government licence. The home trade area comprised the coast of the UK and continental ports between the Elbe and Brest. The 'home trade' therefore included all of the UK's coastal coal trade as well as some of its most important export trade.

In ballast: A vessel that has discharged its cargo and loaded ballast. In the context of this report it is a vessel that is on passage between ports with no cargo.

Patent fuel: Briquettes of small coal and pitch.

Regulus: Partially smelted copper ore.

Seasale: That part of a colliery's output sent to market by sea transport. Conversely landsale was that part of a colliery's output sent to market by overland transport. A colliery that concentrated its output on markets served by sea transport was called a seasale colliery.

Tramp steamer: For the purposes of this assessment, a merchant steam ship designed to carry bulk goods, i.e. a cargo generally consisting of one type of material. Sometimes given a wider meaning, that of a merchant ship carrying bulk or general cargoes of opportunity or a merchant vessel not on a regular scheduled service.

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APPENDIX I: RCAHMW TERRESTRIAL SITES ASSOCIATED WITH THE COAL PORTS LISTED IN *COFLEIN*

BARRY

NPRN	Name	Type
91514	Bailey's graving dock, Barry Docks	Dock
34235	Barry dock board office	Office
307854	Barry docks lighthouse	Lighthouse
308857	Barry docks sea lock	Dock Gate
34234	Barry docks, Barry	Dockyard
34236	Barry lifeboat launch	Lifeboat Station
33739	Barry no.1 dock hydraulic pumping station; north hydraulic pumping house	Pump House
404879	Lifeboathouse, Barry Docks	Lifeboat Station
91515	Pumphouse at baileys graving dock, Barry Docks	Pump
34287	Watch house bay watch tower, Barry	Coastguard Station
34286	Watchhouse bay rocket shed	Navigation Aid

CARDIFF

NPRN	Name	Type
400367	Blount's Gate; Wales Gate	Gate
34423	Blunch Gate; Blount's Gate, quay, Cardiff	Quay
34240	Bute docks feeder, Cardiff	Leat
34241	Bute docks offices; pier head building, Cardiff	Office
34242	Bute east dock, Cardiff	Dock
34247	Bute east dock: hills dry docks	Dry Dock
34288	Bute west dock basin, Cardiff	Dock
34257	Bute west dock, Cardiff	Dock
305755	Cardiff bay barrage, Cardiff bay	Barrage
300176	Cardiff bay; Cardiff docks pontoon landing stage, Cardiff	Landing Point
300181	Cardiff docks entrance channel	Dock
91412	Cardiff docks, Cardiff	Dockyard
405924	Clarence embankment wharves, Cardiff dock	Wharf
400587	Crawshay's wharf, sea pound, Butetown, Cardiff	Wharf
400581	Graving dock, west bank of sea pound, Butetown, Cardiff	Dry Dock
405916	Louisa	Wreck
34267	Mount Stuart graving docks	Dry Dock
301697	Mount Stuart graving docks power house, Butetown, Cardiff	Engine House
300173	Mount Stuart shipbuilding yard	Shipyard
400586	Penydarren wharf, sea pound, Butetown, Cardiff	Wharf
400584	Plymouth wharf and dock, sea pound, Butetown, Cardiff	Wharf;Dock
405291	Power house at mount stuart graving docks	Pump House
34276	Queen Alexandra dock, Cardiff docks	Dock
34277	Roath basin, Britannia quay	Quay
305754	Roath basin, Cardiff docks	Harbour
34279	Roath dock, Cardiff docks	Dock
405923	Victoria wharf, warehouses	Warehouse

LLANELLI

NPRN	Name	Type
401493	Breakwater west of Llanelli	Breakwater
90535	Careg-fach	Wall
34193	Carmarthenshire dock; raby's shipping place	Dock
34197	Great western dock (1836)	Dock
34199	Jobbings wharf circa 1850	Wharf
96511	Lighthouse, Llanelli breakwater lighthouse	Lighthouse
34201	Llanelli bar	Breakwater
309470	Llanelli docks	Harbour
34203	Llanelli harbour dolphin	Structure
34204	Llanelli harbour light	Lighthouse
34205	Llanelli harbour loading stage	Harbour
34206	Llanelli harbour scouring dock	Scouring Basin
34202	Llanelli harbour; capstain entrance-north dock	Harbour
34207	Llanelli north dock	Dock
34209	Llanelli north dock gates	Dockyard;Gate
34211	Llanelli pier	Pier
90532	Machynys breakwater, Llanelli	Wall
90536	Machynys industrial features, Llanelli	Industrial Site
34214	Neville's shipyard	Shipyard
309224	New dock, Llanelli	Dock
34215	Patent slip (slipway), Llanelli docks	Slipway
34216	Pemberton dock	Dock
34222	Richard Thomas' wharf	Wharf
34223	Spitty ferry	Ferry Crossing
91232	Unknown shipreck	Wreck

NEATH

NPRN	Name	Type
34477	Neath river brick works quay, Neath	Quay
34469	Neath river navigation at Neath Town	River Navigation
34478	Neath river navigation: Neath Town quay	Quay

NEWPORT

NPRN	Name	Type
403430	Alexandra docks; north and south docks	Dock
96539	East Usk lighthouse, Uskmouth, Newport	Lighthouse
403431	Eastern dock, Newport	Dock
91413	Newport docks	Dockyard
307059	Newport medieval ship	Wreck
34298	West Usk lighthouse, Uskmouth, Newport	Lighthouse
34299	Wharves and hoists, Newport	Wharf

PENARTH

NPRN	Name	Type
34271	Penarth Docks	Dock
34260	Custom House, Penarth Docks	Custom House
34265	Marine Buildings, Penarth Dock	Building

PORTHCAWL

NPRN	Name	Type
34275	Porthcawl Harbour, Porthcawl	Harbour
34274	Porthcawl Harbour Light, Porthcawl	Lighthouse

PORT TALBOT

NPRN	Name	Type
913949	Port Talbot Docks	Harbour

BURRY PORT

NPRN	Name	Type
34188	Burry Port Docks Harbour	Harbour
34224	Burry Port Docks; Pembrey New Harbour (Primary Record)	Harbour
34226	Burry Port East Dock	Dock
34189	Burry Port Harbour East Dock	Lock
34184	Burry Port Harbour West Dock Lock	Lock
34183	Burry Port Lifeboat House	Lifeboat Station
34385	Burry Port West Dock	Dock
34190	Burry Port West Dock	Harbour
34196	East Dock Burry Port	Dock
407760	West Breakwater, Burry Port Harbour	Breakwater
34186	Burry Port Lighthouse	Lighthouse
381 382 383	Burry Port Harbour Canal Barges 1-3	Wreck

BRITTON FERRY

NPRN	Name	Type
34237	Briton Ferry Dock	Dock
34238	Briton Ferry Dock Entrance	Dock

MILFORD HAVEN

NPRN	Name	Type
407932	Milford Haven Waterway; Aberdaugleddy	Harbour River Navigation
34312	Milford Haven Docks	Dock
34609	Milford Haven Dockyard	Dockyard
34301	Bollards, Milford Haven	Bollard
401363	Jetty at South Hook Point, Milford Haven	Jetty

SWANSEA

NPRN	Name	Type
308355	Customs watch house, Swansea Harbour	Custom House
706	Great eastern pier, Fabian's Bay	Pier
34262	Harbour wall (remains)	Wall
34270	North dock Swansea bollard	Mooring Bollard
309218	North dock, Swansea	Dock

34480	Penclawdd canal sea dock	Dock
300028	South dock; Swansea marina, Swansea	Dock
34282	Swansea dock pilot house	Building
580	Swansea docks	Dock
34281	Swansea docks hulk; lady quirk	Wreck
34283	Swansea harbour	Harbour
308200	Swansea harbour lights east pier	Lighthouse
308198	Swansea harbour lights west pier	Lighthouse
31897	Swansea harbour trust offices; associated British ports harbour offices, Swansea	Office
34284	Swansea north docks bollard	
309219	Victoria quay, Swansea	Quay
90541	Wall, mount pleasant	Wall

MOSTYN

NPRN	Name	Type
408297	Mostyn Quay, Mostyn	Quay

APPENDIX II: KNOWN WRECKS ASSOCIATED WITH THE COAL TRADE

WA No.	Name of vessel	Latitude (DDM)	Longitude (DDM)	UKHO Wreck No.	Date of loss	Type	GT	Voyage from	Yoyage to	Cause of loss
2000	*Pallion* (probably)	51 05.658	04 47.930	12210	1873	SS	1146	Cardiff	Suez	Foundered
2001	*Glenisla* (possibly)	51 54.275	05 18.714	12109	1886	SS	1559	Glasgow	Savona	Stranded
2002	*Teviotdale*	51 42.460	04 23.127	12356	1886	SV	1695/1623	Cardiff	Bombay	Stranded
2003	*Captain McClintock*	53 25.115	04 19.771	7306	1886	SS	267	Garston	Dublin	Foundered
2004	*City of Exeter*	51 07.029	04 43.816	12216	1887	SS	1054	Cardiff	St Nazaire	Foundered
2005	*Clydesdale*	51 58.191	05 23.297	12134	1890	SS	972	Newport	Dublin	Foundered
2006	*Sovereign* (possibly)	51 20.028	04 50.066	12268	1890	SV	1224			Collision
2007	*Musgrave*	51 56.917	05 12.333	12123	1892	SS	252			Stranded
2008	*Theme* (probably)	53 30.914	04 42.518	7348	1895	SS		Swansea	Belfast	Foundered or collision
2009	*Albert*	53 25.382	03 08.730	7557	1896	Barge	63			Stranded, then foundered after refloating
2010	*Rajah*	51 05.030	04 35.067	12206	1896	SV	1256	Barry	Hong Kong	Foundered
2011	*Salado*	51 11.479	04 39.900	12240	1897	SS	2188	Newport	Buenos Aires	
2012	*Graffoe*	51 51.025	05 20.063	12078	1903	SS	2996	Glasgow	Montevideo	Stranded

WA No.	Name of vessel	Latitude (DDM)	Longitude (DDM)	UKHO Wreck No.	Date of loss	Type	GT	Voyage from	Yoyage to	Cause of loss
2013	*Dalserf*	51 43.759	05 28.596	12051	1910	SS	1849	Penarth	Oban	Stranded
2014	*Tenet* (possibly)	51 52.675	05 23.463	12095	1912	SS	603	Newport	Londonderry	
2015	*Tenet*	51 52.025	05 23.063	12091	1912	SS	603	Newport	Londonderry	
2016	*Corundum* (probably)	51 28.962	04 36.537	11961	1914	SS	1203	Burry Port	Rouen	Collision
2017	*Strathnairn* (possibly)	52 11.606	05 27.130	9896	1915	SS	4336	Penarth	Archangel	Enemy action
2018	*Mona*	53 21.015	03 57.990	7509	1916	SS	207	Garston	Dublin	Foundered
2019	*Faith*	51 40.750	05 10.250	11990	1916	SV	76	Cardiff	Wexford	Stranded
2020	*Constance*	53 33.597	04 00.107	7429	1917	SS				
2021	*Bestwood* (possibly)	51 56.707	05 40.945	12164	1917	SS	2248	Cardiff	Loch Ewe	Collision
2022	*Gisella* (possibly)	51 39.609	05 17.280	11981	1917	SS	2502			Enemy action
2023	*St Jacques* (probably)	51 38.298	05 06.769	58707	1917	SS	2459	Barry	Bizerta	Enemy action
2024	*Lord Derby* (probably)	51 32.252	05 16.678	11926	1917	SS	3757	Cardiff	Milford Haven	Enemy action
2025	*Aghios Spyridon*	51 19.972	04 23.517	12265	1917	SS	1618	Swansea	Naples	Enemy action
2026	*Mountpark* (possibly)	51 14.110	04 38.799	12250	1917	SS	1376			Collision
2027	*St Jacques*	51 40.026	05 10.064	11984	1917	SS	2459	Barry	Bizerta	Enemy action
2028	*Agricola*	51 13.529	05 04.014	11872	1917	SV	49	Garston	Cherbourg	Enemy action
2029	*Gurli*	51 05.530	04 38.567	12208	1917	SS	542	Swansea	Rouen	Foundered

WA No.	Name of vessel	Latitude (DDM)	Longitude (DDM)	UKHO Wreck No.	Date of loss	Type	GT	Voyage from	Yoyage to	Cause of loss
2030	*Boscastle* (possibly)	52 14.722	05 17.031	9898	1918	SS	2346	Barry	Scapa Flow	Enemy action
2031	*Kassanga* (possibly)	52 10.639	05 23.380	9891	1918	SS	3015			Enemy action
2032	*Tweed*	52 10.583	05 50.383	9894	1918	SS	1777	Clyde	Devonport	Enemy action
2033	*Highcliffe*	52 05.967	05 53.517	9870	1918	SS	3238			Enemy action
2034	*Sarpfos*	53 49.511	04 55.567	7385	1918	SS	1458	Swansea	Odde	Enemy action
2035	*Elizabeth Alice*	51 45.025	05 14.564	12064	1920	SV	152	Swansea	Malmo	Foundered
2036	*Canterbury Bell*	51 21.753	04 57.687	12264	1922	SS	703	Llanelli	Corcubion	Foundered
2037	*Mar del Plata*	51 43.000	05 35.000	12042	1923		1191	Clyde		Stranded
2038	*Ethel*	52 12.273	05 12.231	9902	1925	SS	178	Newport	Dublin	Foundered
2039	*Bidsie and Bell*	53 19.848	04 37.152	7256	1925	SV	371	Garston	Bideford	Stranded
2040	*Mayals*	51 42.126	05 02.365	69915	1931	SV	226	Runcorn	Falmouth	Collision
2041	*Mervyn* (probably)	51 33.277	05 34.961	11931	1939	SS	3408	Barry	Lisbon	Collision
2042	*Thorold* (probably)	51 41.609	05 41.261	12010	1940	SS	1689	Cardiff	London	Enemy action
2043	*Philotis* (probably)	51 36.995	05 09.226	11960	1940	SS	880	Swansea	Lisbon	Unknown
2044	*Leonard Pearce*	51 16.517	04 25.912	12254	1940	SS	1571	Barry	London	Collision

WA No.	Name of vessel	Latitude (DDM)	Longitude (DDM)	UKHO Wreck No.	Date of loss	Type	GT	Voyage from	Yoyage to	Cause of loss
2045	*Thorold* (probably)	51 39.659	05 39.194	11982	1940	SS	1689	Cardiff	London	Enemy action
2046	*Amwlch Rose* (probably)	53 31.514	03 49.542	8204	1941	SS	632	Partington (nr. Manchester)	Dublin	Enemy action (probably)
2047	*Maurita*	53 24.915	03 13.879	7534	1941	SS	199	Point of Ayr	Lancaster	Enemy action
2048	*Thor*	51 41.693	05 08.773	12016	1943	MV	326	Partington (nr. Manchester)	Fremington	Foundered
2049	*Clapham* (probably)	51 37.013	05 13.704	11961	1943	SS	785	Cardiff	Belfast	Collision
2050	*Clapham*	51 37.326	05 12.064	11962	1943	SS	785	Cardiff	Belfast	Collision
2051	*PLM 21*	51 42.059	05 06.465	12024	1944	SS	5417		Milford	Stranded
2052	*Antonio*	51 36.975	05 10.561	11959	1945	SS	5225	Cardiff	Gibraltar	Collision
2053	*Monte Gurugu* (possibly)	51 08.623	04 30.937	12225	1949	SS	3554	Newport	Genoa	Foundered
2054	*Robert*	51 11.096	04 38.808	12238	1975	MV	350	Cardiff	Rouen	Foundered
2055	*Captain McClintock* (possibly)	53 26.600	04 20.054	7330	1886 (09/12)	SS	267	Garston	Dublin	Foundered
2056	*Loweswater*	53 34.847	04 14.355	7366	1894 (21/12)	SV	603 or 633	Garston	Santos, Brazil	Foundered
2057	*The Queen*	53 21 000	05 30.000	69382	1915 (17/08	SS	557	Ayr	Devonport	Enemy action
2058	*Kirby* (probably)	52 40.217	05 27.117	9957	1915 (17/08)	SS	3034			Enemy action

WA No.	Name of vessel	Latitude (DDM)	Longitude (DDM)	UKHO Wreck No.	Date of loss	Type	GT	Voyage from	Yoyage to	Cause of loss
2059	*Kilcoan* (probably)	53 40.233	03 41.196	8033 (dangerous)	1915 (30/01)	SS	465 or 456	Garston	Belfast	Enemy action
2060	*Fairearn* (possibly)	53 26.214	05 06.349	7021	1917 (24/03)	SS	592	Garston	Cork	Enemy action
2061	*Robert Eggleton* (possibly)	52 34.220	04 52.932	10064	1917 (28/12)	SS	2274	Glasgow	Leghorn	Enemy action
2062	*Cyrene* (possibly)	52 57.501	05 08.848	10009	1918 (05/04)	SS	2904	Tyneside	Blayne	Enemy action
2063	*Sarpfos* (probably)	53 51.196	04 46.960	7389	1918 (24/02)	SS	1458			Enemy action
2064	*Glencona* (probably)	53 28.864	04 58.100	7335	1922 (01/03)	SS	282			
2065	*Conovium* (probably)	53 52.563	04 43.712	7487	1923 (27/10)	SS	152	Garston	Dundalk	Foundered
2066	*Excellent*	53 22.515	04 12.822	7278	1926 (30/01)	SV		Garston	Kileel	Foundered
2067	*Miriam Thomas*	53 37.580	04 10.856	7433		SS				Enemy action (?)
2068	*Barge*	53 31.048	03 30.077	7811						
2069	Unknown	53 18.382	04 02.223	7403		Unknown				
2070	*Canterbury Bell*	51 21.753	04 57.687	12271						

APPENDIX III: LOSS LOCATIONS FOR STRANDINGS, 1859-1902

The following locations are recorded in the 'Abstracts of the returns made to the Board of Trade of shipping casualties'. They do not distinguish between total and partial losses.

Location	Strandings 1859-1868	Strandings 1870-1879	Strandings 1892-1902
Abertay Sand, mouth of River Tay	0	8	0
Aberfraw Bank, Anglesey	1	0	0
Barrows Rocks, near the Smalls, Pembrokeshire	0	2	0
Barry Island, Glamorgan	3	2	0
Bendrick Rock, off Barry	0	0	1
Bishops and Clerks' Rocks, Pembrokeshire ('Bishop's Rocks')	0	9	6
Breaksea Sand, Glamorgan	6	0	0
Broadhaven Sands, Pembrokeshire	1	0	0
Burrows Sand, Swansea	1	0	0
Burry Holmes, Bristol Channel	0	1	0
Cardiff Sands, Glamorgan	2	10	13
Carigy Llong Rock, Anglesey	1	2	0
Carr Rock, Milford Haven	0	0	1
Carregonen Island, Pembrokeshire	1	0	0
Castellcock Rocks, Pembrokeshire	1	0	0
Castle Rock, Aberystwyth	0	0	1
Causeway, Menai Straits	0	1	0
Cefn Sedan Sands, Carmarthen	2	0	0
Chapel Rock, near Aberthaw, Glamorgan	0	2	0
Chapel Rock, entrance to the River Wye	0	0	2
Cheese Rock, Menai Straits	1	0	0
Cherry Stone Rock, off Mumbles Head	1	0	0
Clippera Rocks, Holyhead Bay	1	0	2
Coal Rock, Anglesey	1	4	0
Conger Rocks, Bristol Channel	2	0	0
Constable Bank, Abergele Bay, Denbighshire	1	1	0
Copperas Rock, Glamorgan	0	1	0
Corml Mawr Sands, Caermarthen	0	1	0
Cow and Calf Rocks, Fishguard Roads	0	1	0
Crow Rock, Pembrokeshire	2	8	1
Culver Sands, Bristol Channel	0	0	2
Cymmaren Rocks, Caernarvon Bay	4	0	0
Danger Reef, Glamorgan	0	0	1
Dinas Rocks, Anglesey	1	0	0
Dulas Island, Anglesey	5	11	0
Dutchman's Bank, Anglesey	3	5	4
East Mouse, Anglesey	0	0	2
Ebb Stone, Porthglais	1	1	0
English Grounds, Bristol Channel	0	2	6
Flatholms, Bristol Channel	0	0	1
Ffridien Rock, Anglesey	1	1	0
Flimston Head Rocks, Pembrokeshire	1	0	0
Fury Bank, Glamorgan	1	0	0
Gair Reef, near Aberaeron	1	0	0

Location	Strandings 1859-1868	Strandings 1870-1879	Strandings 1892-1902
Gimlet Rock, off Pwllheli	0	0	2
Goodwick Sands, Pembrokeshire	3	15	9
Gorred Gro Rocks, Menai Straits	0	1	0
Grassholm Island, St . Bride's Bay	0	1	2
Green Grounds, Swansea Bay	0	0	2
Harry Furlong's Rocks, Anglesey	3	3	1
Hats and Barrels, Pembrokeshire	2	0	4
Helbre Rocks, Cheshire	0	0	1
Helwick Sands, Glamorganshire	1	1	3
High Cliff Bank, near Tenby, Pembrokeshire	1	1	0
Holmes Sand, Bristol Channel	5	2	0
Hook Sand, Bristol Channel	0	0	5
Hooper Sand, Burry Inlet, Glamorgan	3	2	0
Horse Rock, Ramsey Sound	1	3	2
Irishman Spit, Menai Strait	0	0	1
Kenfig Sands, Glamorgan	3	2	3
Kynys Wullt Rock, off Crigyll, Anglesea	0	1	0
Lavan Sands, Caernarfonshire ('Leven Sands, Menai Strait')	1	0	24
Lynch Sand, Burry River	0	1	0
Maen Bugail Rock, Caernarfonshire	0	0	1
Maen Piscar Rocks, off Holyhead	0	0	1
Maen Meet Rock, off Bardsey Island	1	0	0
Middle Grounds, Bristol Channel	0	0	1
Middle Mouse, off Cemaes, Anglesey	0	1	2
Middle Spit, Cardiff Roads	0	2	0
Mixen Sand, near the Mumbles, Gower ('Mixon Shoal')	1	3	2
Monkstone, Bristol Channel	0	0	6
Morgan Sands, Glamorgan	1	0	0
Mouse Trap Rock, Lundy Island	0	0	1
Muscle Bank, Menai Straits	0	1	0
Nash Sand, Glamorgan	7	10	20
Needle Rock, off Lundy Island	0	0	1
Newgate Sand, Pembroke	1	1	0
Newport Sands, Pembrokeshire	3	0	0
North Bishop Rock, Pembrokeshire	0	1	0
North Hooper Sand, Carmarthenshire	1	0	0
North Sand, near Tenby	1	0	0
One Fathom Bank, Bristol Channel	0	0	1
Orange Bank, Carmarthenshire	1	0	0
Oxcar Rock, Aberdour	1	0	0
Oysters Rocks, off Porthdynllaen	0	0	1
Patches Rocks, off Aberystwyth	0	0	1
Pembrey Sands, Carmarthenshire	2	0	0
Pendine Sand, Pembrokeshire	1	2	0
Penhros Sands, Caernarvonshire	9	0	0
Penrhyn Rock, near Holyhead	1	0	0
Penlas Rock, Holyhead	1	0	1
Pisgah Rock, Anglesey	1	0	0
Platters Rocks, Holyhead Harbour	0	0	18
Platters Rocks, Skerries, Anglesey	8	5	5

Location	Strandings 1859-1868	Strandings 1870-1879	Strandings 1892-1902
Porthcawl Sands, Glamorgan	5	0	0
Puffin Island, Anglesey	0	7	3
Ranie Spit, Glamorgan	0	1	4
Red Stones, near Helbre Island	0	0	2
Rhoscolyn Cairn, Anglesey	1	2	0
Rhosilly (Rhossili) Sand, Glamorgan (Gower)	1	1	0
Salisbury Bank, River Dee	0	2	5
Salt Island, Holyhead	1	0	0
Sarn Badrig, Cardigan Bay (‘Causeway’/‘St Patrick’s Causeway’)	2	3	6
Sarn-y-Bwch, Cardigan Bay	0	0	1
Saundersfoot Sand, Pembrokeshire	2	0	0
Scars Rocks, near Solva Harbour, Pembrokeshire	0	1	0
Scarweather Sands, Bristol Channel (‘Skerweather Shoal, Glamorgan’)	13	5	4
Seldom Seen Rocks, River Dee	0	1	0
Sheep Island, Milford	2	0	0
Skear Rock, Tenby	1	0	0
Skerries, Anglesey	5	5	3
Skokholm Island, near Milford Haven	0	3	8
Skomer Island, near Milford Haven	0	0	4
Skomer Rock, Pembrokeshire	2	0	0
Sledges Rocks, Pembrokeshire	2	0	0
Smalls Rocks, Pembrokeshire	1	2	5
South Bank, Aberdovey (‘South Bank, River Tay’)	1	1	0
Spit Sand, Bristol Channel	0	4	0
Steepholm, Bristol Channel	0	1	1
Sully Island, Glamorganshire	6	5	4
Sully Ledge, Bristol Channel	0	0	3
Swellies Rocks, Menai Straits (‘Swilley’/‘Swilley Rocks, Anglesey’)	1	5	10
Thorn Island, entrance to Milford Haven	0	0	2
Toe Rocks, Milford Haven	0	1	4
Towen Sands, Carmarthen	2	2	0
Trevallen Rocks, Pembrokeshire	0	1	0
Tug Scad Rocks, Pehrhosfilo, Anglesey	1	0	0
Tusker Rock, Glamorgan	1	3	2
Twyn-y-Griben Rocks, Ang	2	0	0
Uschaf Rock, Penglegyr Point, Pembrokeshire	0	0	1
Usk Patch, Bristol Channel	0	0	3
Weir Island, Menai Straits	0	1	0
Welsh Hook, Bristol Channel	0	2	0
Welsh Sands, Bristol Channel	1	0	4
West Mouse Sand, Anglesey	1	2	0
West Mouse Rocks, off Anglesey	0	0	1
White Sand, Cardigan	1	0	0
Whitford Sands, Flintshire	1	0	0
Whitford Sands, Glamorgan	1	1	0
Wolves Rocks, Bristol Channel	10	10	5
Woodhouse Rocks, Pembroke	1	0	0

APPENDIX IV: RIVER AND HARBOUR LOSSES, YEAR ENDED 30TH JUNE 1902

The following locations are recorded in the 'Abstract of the returns made to the Board of Trade of shipping casualties' for the year ended 30th June 1902. They include only total losses.

River or harbour	Nature of casualty				Vessel				No. total losses	Lives lost
					British		Foreign			
	F	S	C	Other	SV	SS	SV	SS		
Amwlch	0	0	1	0	0	0	1	0	0	1
Bangor	0	3	0	0	1	2	0	0	0	0
Barry	0	26	10	7	7	34	2	11	2	3
Briton Ferry	0	2	0	0	0	1	0	1	0	0
Cardiff	0	25	23	7	6	46	8	19	0	0
Caernarvon	0	1	0	0	0	1	0	0	0	0
Clwyd	0	1	0	0	1	0	0	0	0	0
Conway	0	1	0	0	0	1	0	0	0	0
Dee	0	7	3	0	10	3	0	0	0	0
Holyhead	0	0	0	2	1	1	0	0	0	5
Llanelli	0	1	0	0	0	1	0	0	0	0
Milford	0	4	11	0	12	18	0	0	0	0
Neath	0	3	0	0	0	3	0	0	0	0
Port Talbot	0	3	1	1	0	5	1	0	0	0
St Davids	0	0	1	0	0	0	2	0	0	0
Swansea	0	8	7	3	1	15	4	5	0	1
Tay	0	2	2	2	0	7	1	0	0	0
Teify	0	0	0	1	0	1	0	0	0	0
Tenby	0	0	1	0	2	0	0	0	0	0
Usk	0	8	17	2	15	25	0	5	0	0
UK total	**9**	**567**	**1095**	**222**	**1219**	**1597**	**91**	**267**	**44**	**28**

F – Foundered
S – Stranded
C - Collision
SS – Sailing vessel
SV - Steamship

APPENDIX V: NATIONAL REGISTER OF HISTORIC VESSELS

The NRHV is a database of vessels which:

- were built in the UK and are at least 50 years old; or
- were built outside the UK but were used for a specific UK purpose between 1939 and 1945;
- are over 40ft (12.19m) in length (not including bowsprit);
- are based in UK waters;
- are substantially intact;
- have extraordinary maritime importance.

There are currently over 1,200 vessels listed. The database includes details of designer, builder, dimensions, construction, propulsion, service history, current location and ownership, as well as images of some vessels.

The NRHV, created and maintained with the support of the Heritage Lottery Fund, English Heritage and the National Maritime Museum, provides an authoritative assessment of the significance of historic vessels. The database can also be used to identify and prioritise vessels that should be preserved, provide guidance to decision-makers on the allocation of funding, and give an early warning of ships 'at risk'. The database can also be used as a research tool.

Within the NRHV there are two important sub-groups:

Core Collection

The Core Collection (CC) are historic vessels which:

- are of pre-eminent national importance;
- span the spectrum of achievement of UK maritime history;
- illustrate changes in construction and technology;
- merit a higher priority for long term preservation;
- merit a greater degree of support.

There are currently 60 vessels in the Core Collection.

Designated Vessels

The Designated Vessels (DV) list is of vessels which:

- are of substantial heritage merit;
- may be of more vernacular significance;
- may be of greater regional or local significance;
- merit support ahead of other non-Core Collection vessels.

There are 152 vessels on the Designated Vessels list.

Over 57% of historic vessels recorded on the Register are either privately owned or commercially operated. Museums and charitable trusts account for 14% of the total.

APPENDIX VI: WA RECORDING LEVELS

Level	Type	Objective	Sub-level	Character	Scope	Description
1	Assessment	A record sufficient to establish the presence, position and type of site.	1a	Indirect (desk-based)	A basic record based on documentary, cartographic or graphic sources, including photographic (incl. AP), geotechnical and geophysical surveys commissioned for purposes other than archaeology.	Documentary assessment / inventory of a site, compiled at the start of work on a site, and updated as work progresses.
			1b	Direct (field)	A basic record based on field observation, walkover survey, diving inspection etc., including surveys commissioned specifically for archaeological purposes.	Typically a 1-2 dive visit to the site (to assess a geophysical anomaly, etc.).
2	Evaluation	A record that provides sufficient data to establish the extent, character, date and importance of the site.	2a	Non-intrusive	A limited record based on investigations that might include light cleaning, probing and spot sampling, but without bulk removal of plant growth, soil, debris etc.	Typically a 2-4 dive visit to assess the site's archaeological potential, backed up by a sketch plan of the site with some key measurements included.
			2b	Intrusive	A limited record based on investigations including vigorous cleaning, test pits and/or trenches. May also include recovery (following recording) of elements at immediate risk, or disturbed by investigation.	Either an assessment of the buried remains present on a site; the recovery of surface artefacts; or cleaning to inform for example a 2a investigation.
3	In situ	A record that enables an Archaeologist who has not seen the site to comprehend its components, layout and sequences.	3a	Diagnostic	A detailed record of selected elements of the site.	The first stage of a full record of the site. This would include a full measured sketch of the site and a database (or equivalent) entry for all surface artefacts.
			3b	Unexcavated	A detailed record of all elements of the site visible without excavation.	Full site plan (i.e. planning frame or equivalent accuracy) with individual object drawings, and full photo record (possibly including a mosaic).
			3c	Excavated	A detailed record of all elements of the site exposed by open excavation of part or whole of the site.	This may take the form of full or partial excavation of a site.

Level	Type	Objective	Sub-level	Character	Scope	Description
4	Removal	A record sufficient to enable analytical reconstruction and/ or reinterpretation of the site, its components and its matrix.			A complete record of all elements of the site in the course of dismantling and/or excavation.	
5	Intra-site	A record that places the site in the context of its landscape and other comparable sites.			A complete record of all elements of the site, combined with selective recording of comparable sites and investigation of the surrounding area.	

Note: these levels represent guidance formulated by Wessex Archaeology for use during the archaeological investigation of wreck sites. They are currently used by curators, but have not been formally accepted as a standard means of grading archaeological work.

APPENDIX VI: KNOWN LOSSES OF SAILING VESSELS CARRYING COAL TO OR FROM WALES 1800-1945

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1000	*Dione*	Bristol Channel ('on the Middle Ground')	1800	Sailing vessel (unspecified)	Cardiff	London
1001	*Belle Anne*	Near Swansea, Glamorgan	1802	Sailing vessel (type unknown)	Swansea	Alderney
1002	*Two Brothers*	Bristol Channel	1803	Sailing vessel (sloop)	Llanelli	Carmarthen
1003	*Mary Anne*	Near Tenby, Pembrokeshire	1804	Sailing vessel (sloop)	Cardiff	Exeter
1004	*Fanny*	Skysea, Gower	1805	Sailing vessel (unspecified)	Neath	Cork
1005	*Seaflower*	Fishguard Bay, Pembrokeshire	1805	Sailing vessel (type unknown)	Swansea	Dublin
1006	*Charlotte*	Cardiff Canal, Glamorgan	1807	Sailing vessel (type unknown)	Cardiff	London
1007	*Lark*	Great Ormes Head (off), Denbighshire	1808	Sailing vessel (unspecified)	Newport	
1008	*Merchant Taylor*	The Holms (near), Bristol Channel	1810	Sailing vessel (brig)	Newport	Plymouth
1009	*Ann & Sarah*	Rhosili Bay	1813	Sailing vessel (sloop)	Llanelli	Ilfracombe?
1010	*Elizabeth*	Near the Mixon, Gower	1817	Sailing vessel (unspecified)	Swansea	
1011	*Ancient Briton*	Bristol Channel	1818	Sailing vessel (unspecified)	Newport	Minehead
1012	*Victory*	Monkstone, Bristol Channel	1818	Sailing vessel (unspecified)	Newport	Ireland
1013	*True Briton*	St George's Channel (S. end)	1819	Sailing vessel (brigantine)	Swansea	Hayle
1014	*Friends*	Nash Point, near Dunraven, Glamorgan	1819	Sailing vessel (sloop)	Swansea	Bridgwater
1015	*Flora*	Great Castle Head, Milford Haven, Pembrokeshire	1819	Sailing vessel (type unknown)	Bury	Dublin
1016	*Nancy*	Near Milford, Pembrokeshire	1819	Sailing vessel (type unknown)	Newport	Belfast
1017	*Nancy*	Rock near Nash Point, Glamorgan	1820	Sailing vessel (type unknown)	Swansea	Bridgwater
1018	*Sisters*	Rock near Nash Point, Glamorgan	1820	Sailing vessel (type unknown)	Swansea	Bridgwater
1019	*Bee*	Nash Sands (near), Bristol Channel	1820	Sailing vessel (unspecified)	Chepstow	Dublin
1020	*Charlotte*	Hook Sand, Bristol Channel	1820	Sailing vessel (unspecified)	Pligwently (Pillgwently, Newport?)	Bristol

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1021	*Prince Edward*	St George's Channel (S end)	1821	Sailing vessel (sloop)	Swansea	Youghal
1022	*Royalist*	Sandyhaven Bay, Milford Haven, Pembrokeshire	1822	Sailing vessel (type unknown)	Cardiff	London
1023	*Sally and William*	Oxwich Bay, Gower, Glamorgan	1822	Sailing vessel (type unknown)	Swansea	Jersey
1024	*Edward*	Gore Sand, Bridgwater Bay, Bristol Channel	1822	Sailing vessel (unspecified)	Newport	Bridgwater
1025	*Anna & Louisa*	The Swilly, near Bangor Ferry, Caernarfonshire	1824	Sailing vessel (sloop)	Cardiff	Liverpool
1026	*Susannah*	West of Strumble Head, Fishguard, Pembrokeshire	1824	Sailing vessel (type unknown)	Swansea	Liverpool
1027	*Endeavour*	Gore Sand (near Burnham-on-Sea), Bridgwater Bay, Bristol Channel	1826	Sailing vessel (schooner)	Newport	Bridgwater
1028	*Rose*	Dunster (near), Minehead, Somerset	1826	Sailing vessel (unspecified)	Newport	Plymouth
1029	*Hope*	Goultrop Roads, Newport, Fishguard, Pembrokeshire	1827	Sailing vessel (sloop)	Pembroke	Newport
1030	*Harriet*	Nash Sands, Nash Point, Glamorgan	1827	Sailing vessel (type unknown)	Cardiff	London
1031	*Venus*	Freshwater Bay, St Govan's Head, Pembrokeshire	1827	Sailing vessel (type unknown)	Newport	Limerick
1032	*Colombus*	Swansea Bay, Glamorgan	1831	Sailing vessel (type unknown)	Cardiff	Blyth
1033	*Kitty*	Fishguard Bay, Pembrokeshire	1831	Sailing vessel (type unknown)	Newport	Youghal
1034	*Neptune*	Porthkerry Bay, Barry, Glamorgan	1831	Sailing vessel (type unknown)	Newport	Wexford
1035	*Union*	West Scar, Swansea Bay, Glamorgan	1831	Sailing vessel (type unknown)	Swansea	Bridgwater
1036	*Jonas*	The Mumbles, Swansea Bay, Glamorgan	1832	Sailing vessel (type unknown)	Swansea	London
1037	*Frances Ann*	Swansea Bay, Carmarthen	1833	Sailing vessel (schooner)	Swansea	St Ives
1038	*Ardent*	Aberystwyth, Cardigan Bay, Cardiganshire	1833	Sailing vessel (type unknown)	Cardiff	Liverpool

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1039	*Blandford*	Porthkerry Bay, Barry, Glamorgan	1833	Sailing vessel (type unknown)	Cardiff	
1040	*Glory*	Penarth Beach, Glamorgan	1833	Sailing vessel (type unknown)	Newport	Liverpool
1041	*Hibernia*	Penarth Roads, Glamorgan	1833	Sailing vessel (type unknown)	Newport	Cork
1042	*Malvina*	River Usk Estuary, Newport, Glamorgan	1833	Sailing vessel (type unknown)	Newport	Gibraltar
1043	*Syren*	Near Burry Holmes, Gower, Glamorgan	1833	Sailing vessel (brig)	Swansea	Malta
1044	*Margaret*	Caernarfon Bay, Caernarfonshire	1833	Sailing vessel (unspecified)	Cardiff	Preston
1045	*Frances Anne*	Near Greengrounds off Mumbles, Gower	1833	Sailing vessel (schooner)	St Ives	
1046	*Surprise*	Swansea Bay	1833	Sailing vessel (smack)	Bude	
1047	*Margaret*	Mixon Sands, Swansea, Glamorgan	1834	Sailing vessel (barque)	Swansea	Alexandria
1048	*Mary Ann*	Mixon Sands, Swansea, Glamorgan	1834	Sailing vessel (schooner)	Cardiff	Wexford
1049	*Hopewell*	Off Saint Govan's Head, Pembrokeshire	1834	Sailing vessel (sloop)	Newport	Aberystwyth
1050	*Zephyr*	Cardiff approach, Glamorgan	1834	Sailing vessel (type unknown)	Cardiff	London
1051	*Providence*	Saint Ann's Head Lighthouse, Milford Haven, Pembrokeshire	1836	Sailing vessel (type unknown)	Cardiff	Oporto
1052	*Dispatch*	Off the Smalls, Skomer Island, Pembrokeshire	1837	Sailing vessel (type unknown)	Cardiff	Youghal
1053	*Alexander*	Stadpole, Milford Haven, Pembrokeshire	1839	Sailing vessel (type unknown)	Llanelli	London
1054	*Apollo*	St. Bride's Bay, Pembrokeshire	1839	Sailing vessel (type unknown)	Newport	Cork
1055	*Hopewell*	Near Nash Point Lighthouse, Glamorgan	1840	Sailing vessel (type unknown)	Newport	Cork
1056	*Caledonia*	North Ridge, River Lougher, near Llanelli, Carmarthen	1841	Sailing vessel (barque)	Llanelli	Jamaica
1057	Unidentified	Lavernoch Point, Penarth, Glamorgan	1841	Sailing vessel (brig)	Newport	London

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1058	*Prince Regent*	Afon Tywi River, Carmarthen	1841	Sailing vessel (sloop)	Llanelli	Milford
1059	*Argyle*	Penarth Beach, Glamorgan	1841	Sailing vessel (type unknown)	Newport	Falmouth
1060	*Maidstone*	Lavernoch Point, Penarth, Glamorgan	1841	Sailing vessel (type unknown)	Newport	London
1061	*Salacia*	Near Saint Ann's Head, Pembrokeshire	1841	Sailing vessel (type unknown)	Newport	Nantes
1062	*Bridget*	Bristol Channel (25m WNW of Land's End)	1841	Sailing vessel (unspecified)	Llanelli	Woolwich
1063	*Industry*	Near Mumbles Head Lighthouse, Glamorgan	1842	Sailing vessel (sloop)	Cardiff	Mumbles
1064	*Berthholly*	Barmouth Beach, Montgomery	1843	Sailing vessel (schooner)	Newport	
1065	*Thomas & Mary*	Watchet (off), Somerset	1843	Sailing vessel (schooner)	Cardiff	London
1066	*Diligence*	Grassholme Island (off), Pembrokeshire	1843	Sailing vessel (sloop)	Newport	Aberdovey
1067	*Swan*	Near Porthcawl, Glamorgan	1843	Sailing vessel (type unknown)	Cardiff	Swansea
1068	*Liverpool Packet*	Rhosili Bay, Gower	1843	Sailing vessel (brig)	Newport	Penzance
1069	*Edwin*	Barmouth beach (1/2m N of town)	1843	Sailing vessel (schooner)	Mostyn	Barmouth
1070	*Earl Gowrie*	The Mixon, Gower	1848	Sailing vessel (brigantine)		Waterford
1071	*Charlotte*	Bristol Channel (25m W of Lundy)	1852	Sailing vessel (brig)	Llanelli	Plymouth
1072	*Feronia*	St. Bride's Bay (off), Pembrokeshire	1852	Sailing vessel (type unknown)	Llanelli	Dublin
1073	*Betsy*	Cardigan Bar, Cardiganshire	1852	Sailing vessel (smack)	Milford Haven	Caernarfon
1074	*Monmouth*	Bristol Channel	1852	Sailing vessel (barge)	Newport/ Lydney	Somerset
1075	*Stag*	Puffin Island (near), Anglesey	1852	Sailing vessel (sloop)	Saltney, Chester	Holyhead
1076	*Independent*	Bute Docks, Cardiff, Glamorgan	1853	Sailing vessel (brig)	Cardiff	
1077	*Asiatic*	The Smalls (off), Skomer Island, Pembrokeshire	1853	Sailing vessel (schooner)	Cardiff	Cork

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1078	*Mary Cook*	Breaksea Point, Barry, Glamorgan	1853	Sailing vessel (schooner)	Cardiff	Stranraer
1079	*Sarah Fleming*	2.5m SW of Barry, Glamorgan	1853	Sailing vessel (snow)	Cardiff	Cape of Good Hope
1080	Unidentified	Bristol Channel (10 leagues W of Lundy)	1853	Sailing vessel (unspecified)	Cardiff	Bremen, Germany
1081	*Smith*	Monkstone, Penarth, Bristol Channel	1853	Sailing vessel (brigantine)	Newport	Cork
1082	*Pearl*	Saundersfoot, Carmarthen	1853	Sailing vessel (sloop)	Newport	Carmarthen
1083	*William*	Steep Holm, Bristol Channel	1853	Sailing vessel (sloop)	Newport	Bridgwater
1084	*Mary*	Skokholm Island (near), St. Ann's Head, Pembrokeshire	1853	Sailing vessel (brig)	Swansea	Limerick
1085	*Nettuno*	Near Mumbles Head Lighthouse, Glamorgan	1853	Sailing vessel (brigantine)	Swansea	Cape Verde
1086	*Trial*	Near Helwick Head, Worms Head, Glamorgan	1853	Sailing vessel (schooner)	Swansea	Waterford
1087	*Nettuno*	SE of Mumbles Lighthouse	1853	Sailing vessel (brig)	Swansea	Cape Verde
1088	*Caja*	Port-Eynon, Glamorgan	1854	Sailing vessel (brig)	Cardiff	Constantinople
1089	*Eliza*	Careg Malltreath, Malltreath Bay, Anglesey	1854	Sailing vessel (brig)	Cardiff	Liverpool
1090	*Henry*	Holyhead (near new harbour breakwater), Anglesey	1854	Sailing vessel (brig)	Cardiff	Liverpool
1091	*Zenith*	Newton Bay, Porthcawl, Glamorgan	1854	Sailing vessel (brig)	Cardiff	Bona
1092	*Hillechina*	Off Cardiff, Glamorgan	1854	Sailing vessel (schooner)	Cardiff	
1093	*Isabella*	Porthcawl, Glamorgan	1854	Sailing vessel (schooner)	Cardiff	Liverpool
1094	Unidentified	Steep Holm (near), Bristol Channel	1854	Sailing vessel (sloop)	Cardiff	Bridgwater
1095	*Dolphin*	River Avon (entrance), Severn Estuary	1854	Sailing vessel (unspecified)	Cardiff	Penarth
1096	*Albion*	Holyhead breakwater (entrance of new harbour), Anglesey	1854	Sailing vessel (schooner)	Liverpool	Porthmadog

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1097	*Fanny*	3m E of Saudersfoot Harbour, Carmarthen	1854	Sailing vessel (type unknown)	Llanelli	Tenby
1098	*Undine*	Bangor Bay, Caernarfonshire	1854	Sailing vessel (schooner)	Maryport	Bangor
1099	*Speedwell*	Sheep Island, off Milford Haven, Pembrokeshire	1854	Sailing vessel (schooner)	Neath	Liverpool
1100	*Iris*	St. Govan's Head (off), Pembrokeshire	1854	Sailing vessel (brigantine)	Newport	Liverpool
1101	*New Jane*	New Quay, 5m SW of Aberaeron, Cardiganshire	1854	Sailing vessel (schooner)	Newport	Plymouth
1102	*St. Agnes*	Holm Sand (near Wolves Rocks), Bristol Channel	1854	Sailing vessel (schooner)	Newport	St Agnes
1103	*Three Sisters*	Portishead (off), Severn Estuary	1854	Sailing vessel (unspecified)	Newport	Bristol
1104	*Irma*	Worms Head	1854	Sailing vessel (brig)	Cardiff	
1105	*Frederick Ritzlaff*	Bute Docks, Cardiff, Glamorgan	1855	Sailing vessel (type unknown)	Cardiff	
1106	*Anna Catherine*	Near the Greengrounds, Mumbles	1855	Sailing vessel (brig)	S Wales	London
1107	*Britannia*	Bristol Channel	1857	Sailing vessel (schooner)	Neath	Hayle
1108	*Juantita*	Roadstead of the Mumbles, Swansea Bay, Glamorgan	1857	Sailing vessel (lugger)	Swansea	Seville
1109	*Alexanders*	Bristol Channel	1858	Sailing vessel (brigantine)	Llanelli	St Ives
1110	*Louis*	Port Eynon Point	1858	Sailing vessel (smack)	Llanelli	Rouen
1111	*True Bess*	Haverfordwest (near), Milford Haven, Pembrokeshire	1859	Sailing vessel (smack)	Haverfordwest	
1112	*William & Mary*	Mumbles Head, Gower	1859	Sailing vessel (brigantine)	Swansea	Youghal
1113	*Pilot*	St George's Channel (S end)	1860	Sailing vessel (brig or brigantine)	Newport	Cork
1114	*Salus*	Mouth of the River Burry, Carmarthen	1860	Sailing vessel (snow)	Swansea	South America
1115	*Villiers*	Mixon Sands, Swansea, Glamorgan	1861	Sailing vessel (brigantine)	Cardiff	Alicante
1116	*Catherine*	St George's Channel (S end)	1861	Sailing vessel (schooner)	Milford Haven	Skibbereen, Ireland

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1117	*Harmony*	Penhros Rocks, Holyhead Bay, Anglesey	1863	Sailing vessel (brigantine)	Ayr	Drogheda
1118	*Helen*	Bristol Channel	1863	Sailing vessel (schooner)	South Wales	Penzance
1119	*Laconic*	Helwick Bank, Gower	1863	Sailing vessel (barque)	Swansea	Tenerife
1120	*J.O.*	Whitford Point, Burry	1863	Sailing vessel (brig)	Burry	
1121	*John*	Middle Mouse, off N Anglesey	1863	Sailing vessel (brigantine)	Runcorn	Abersoch
1122	*Industrious*	Nackershole, Port Eynon	1864	Sailing vessel (brig)	Llanelli	Malta
1123	*Desiree*	Oxwich Bay	1864	Sailing vessel (smack)	Swansea	Le Havre
1124	*Isabel*	Mill Bay, Milford Haven, Pembrokeshire	1866	Sailing vessel (schooner)	Briton Ferry	Plymouth
1125	*Montezuma*	The Smalls (near), Skomer Island, Pembrokeshire	1866	Sailing vessel (fully rigged ship)	Cardiff	Alicante, Spain
1126	*Eliza*	3m W of Freshwater East Bay, Pembrokeshire	1866	Sailing vessel (schooner)	Cardiff	Belfast
1127	*Alfred Eliza*	Dale (near), Milford Haven, Pembrokeshire	1866	Sailing vessel (smack)	Cardiff	Rouville, France
1128	*Princess Royal*	St George's Channel (S end)	1866	Sailing vessel (brigantine)	Milford Haven	Waterford
1129	*Bonanza*	Barry Island, Barry, Glamorgan	1866	Sailing vessel (barque)	Newport	Cape of Good Hope
1130	*Moonbeam*	St George's Channel (S end)	1866	Sailing vessel (brigantine)	Newport	Cork
1131	*Chasseur*	Near Greengrounds off Mumbles, Gower	1866	Sailing vessel (brig)	Swansea	Barcelona
1132	*Electric Flash*	Port Eynon Point	1866	Sailing vessel (schooner)	Porthcawl	
1133	*Ann*	Bristol Channel	1867	Sailing vessel (schooner)	Cardiff	Penzance
1134	*Edith*	Penmanmawr, Caernarfonshire	1867	Sailing vessel (sloop)	Liverpool	Penmanmawr
1135	*Mary Elizabeth*	Holyhead (4m off), Anglesey	1867	Sailing vessel (schooner)	Runcorn	Pwllheli
1136	*Espoir*	Lynch Sand, off Whitford	1867	Sailing vessel (lugger)	Swansea	
1137	*Jeune Celine*	Broughton Bay, Burry estuary, Glamorgan	1868	Sailing vessel (brig)	Llanelli	St. Malo
1138	*Onward*	Broughton Bay, Burry estuary, Glamorgan	1868	Sailing vessel (brigantine)	Llanelli	Honfleur
1139	*Amethyst*	Broughton Bay, Burry estuary, Glamorgan	1868	Sailing vessel (schooner)	Llanelli	Framlington

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1140	*Garside*	N Ridge, near Burry Port, Carmarthen	1868	Sailing vessel (schooner)	Llanelli	Bridgwater
1141	*Waterfly*	Broughton Bay, Burry estuary, Glamorgan	1868	Sailing vessel (schooner)	Llanelli	
1142	*Caroline*	Offshore of Mumbles Head, Swansea, Glamorgan	1868	Sailing vessel (smack)	Newport	Bideford
1143	*Matchless*	Holm Sand, Bristol Channel	1869	Sailing vessel (trow)	Cardiff	Bath
1144	*Topsy*	Minehead (off), Somerset	1869	Sailing vessel (ketch)	Newport	Lynmouth
1145	*Amelie*	Nash Bank, Nash Point, Glamorgan	1870	Sailing vessel (lugger)	Cardiff	Lucon
1146	*Nimble*	Bristol Channel	1870	Sailing vessel (schooner)	Cardiff	Dublin
1147	*Love*	Tenby, off	1870	Sailing vessel (sloop)	Cardiff	Porthmadog
1148	*Kelpie*	Milford Haven (near entrance), Pembrokeshire	1870	Sailing vessel (brig)	Newport	Liverpool
1149	*Richard*	Bristol Channel	1870	Sailing vessel (brig)	Newport	Dublin
1150	*Catharine Hodges*	St George's Channel (S end)	1870	Sailing vessel (brigantine)	Newport	Queenstown, Ireland
1151	*New Diligence*	Between Pembrey and Saint David's Head, Pembrokeshire	1870	Sailing vessel (smack)	Pembrey	Aberystwyth
1152	*Index*	Bristol Channel (35m off Lundy)	1871	Sailing vessel (unspecified)	Llanelli	Honfleur, France
1153	*Cornish Diamond*	Near the Mumbles, Glamorgan	1871	Sailing vessel (schooner)	Swansea	Devoran
1154	*Maggie Woodburne*	Skomer Island (W point of)	1872	Sailing vessel (schooner)	Briton Ferry	Newry
1155	*Tavistock*	Carmarthen Bay, Carmarthen	1872	Sailing vessel (schooner)	Port Talbot	Waterford
1156	*Antonio Luca*	Oxwich Point	1872	Sailing vessel (barque)	Newcastle	Venice
1157	*Chebucto*	Scarweather sands, Gower	1872	Sailing vessel (brig)	Swansea	Bilbao
1158	*Lass of Courtown*	Culver Sand (E end of), Bristol Channel	1873	Sailing vessel (schooner)	Cardiff	Bridgwater
1159	*Catherine*	Crow Rock, Linney Head, Milford Haven	1873	Sailing vessel (schooner)	Llanelli	Wexford
1160	*Fly*	Fishguard Roads (15m off)	1873	Sailing vessel (smack)	Pembray	Newport

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1161	*William & Mary*	Caldy Roads, River Dee	1873	Sailing vessel (smack)	Pembrey	Dundalk
1162	*Williams & Mary*	Caldey Roads, Milford Haven	1873	Sailing vessel (smack)	Pembrey	Dundalk
1163	*Whampoa*	Nash Point (3m W of, off Southern Down), Bristol Channel	1873	Sailing vessel (fully rigged ship)	Penarth	Yokohama, Japan
1164	*Lady Proby*	St Govan's Head (4m S of)	1873	Sailing vessel (schooner)	Saundersfoot	Wexford
1165	*Elizabeth*	Worms Head (off), Gower	1873	Sailing vessel (unspecified)	Swansea	St Malo
1166	*Falcon*	Tail of the Spit, Bristol Channel	1874	Sailing vessel (trow)	Newport	Bristol
1167	*Jane Ellen*	Strumble Head (off), Pembrokeshire	1874	Sailing vessel (smack)	Pembrey	Bangor
1168	*Fanny*	Bristol Channel	1875	Sailing vessel (ketch)	Cardiff	Bristol
1169	*Breeze*	Milford Haven, 3 miles from entrance	1875	Sailing vessel (schooner)	Llanelli	Dublin
1170	*J.C.A.*	Bristol Channel	1875	Sailing vessel (schooner)	Milford	Hayle
1171	*Clyde*	Nash Point Lighthouse (off), Bristol Channel	1875	Sailing vessel (smack)	Newport	Truro
1172	*Unity*	St Anne's Lighthouse (off), Pembrokeshire	1875	Sailing vessel (brigantine)	Porthcawl	Cork
1173	*Richard Cowell*	Penarth Roads, Glamorgan	1876	Sailing vessel (barque)	Cardiff	Bermuda
1174	*Ann & Mary*	Broad Sound, Milford Haven	1876	Sailing vessel (schooner)	Cardiff	Holyhead
1175	*Star of Brunswick*	Foreland Point (7m WxN of), Bristol Channel	1876	Sailing vessel (schooner)	Cardiff	Ilfracombe
1176	*Stamford*	Brean Down (0.5m SW of), Somerset	1876	Sailing vessel (smack)	Cardiff	Bridgwater
1177	*Triton*	Little Ormes Head (4m ESE of), Caernarfonshire	1876	Sailing vessel (schooner)	Liverpool	Holyhead
1178	*Hope*	Nash Point Lighthouse (2.5m SW of), Bristol Channel	1876	Sailing vessel (smack)	Newport	Milford Haven
1179	*Laurina*	East Quantoxhead, Somerset	1876	Sailing vessel (smack)	Newport	East Quantoxhead, Somerset

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1180	*First Borwin III*	8m S of Skomer Island, Pembrokeshire	1876	Sailing vessel (schooner)	Swansea	Cork
1181	*Reverie*	Lynch Sand, off Whitford	1876	Sailing vessel (smack)	Cardiff	France
1182	*Paragon*	Angle Bay, Milford Haven	1877	Sailing vessel (brig)	Briton Ferry	Dublin
1183	*Fieres*	S/SW of Lavernock Point, Glamorgan	1877	Sailing vessel (barque)	Cardiff	Malta
1184	*Clotilde*	Burry Port entrance, Glamorgan	1877	Sailing vessel (schooner)	Cardiff	Redon, France
1185	*Queen*	Brean Down, Somerset	1877	Sailing vessel (trow)	Cardiff	Highbridge
1186	*Friends*	Littlestone Pier (2m NE of ?), Bridgwater Bay, Somerset	1877	Sailing vessel (trow)	Ely, Glamorgan	Highbridge, Somerset
1187	*Viper*	Llandudno Bay, Denbighshire	1877	Sailing vessel (flat)	Liverpool	Holyhead
1188	*Esther*	Gt Orme's Head (3m E of), Denbighshire	1877	Sailing vessel (sloop)	Liverpool	Cemaes, Anglesey
1189	*United Friends*	Trefadoc (near), Holyhead, Anglesey	1877	Sailing vessel (sloop)	Liverpool	Trefadoc
1190	*Adventure*	Puffin Island (5m N 0.5m W), Anglesey	1877	Sailing vessel (smack)	Llanarchymir, Flintshire	Beaumaris
1191	*George*	Foreland Point (6m N of), Bristol Channel	1877	Sailing vessel (brigantine)	Newport	Cork
1192	*Olive*	Caldy Island (5m SE of), Pembrokeshire	1877	Sailing vessel (smack)	Porthcawl	Pembroke Dock
1193	*Olive*	Caldey Island (5m SxE of), Bristol Channel	1877	Sailing vessel (smack)	Porthcawl	Pembroke Dock
1194	*Margaret*	Skokholm Island (off), St. Ann's Head, Pembrokeshire	1878	Sailing vessel (schooner)	Briton Ferry	Belfast
1195	*Ella Vail*	Caldey Roads, Bristol Channel	1878	Sailing vessel (brigantine)	Cardiff	Youghal
1196	*Pensiero*	The Smalls Lighthouse (7m E of)	1878	Sailing vessel (brigantine)	Cardiff	Constantinople
1197	*Abeona*	8m S of Nash Point, Glamorgan	1878	Sailing vessel (schooner)	Cardiff	Penzance
1198	*Abeona*	Nash Point (8m S of), Bristol Channel	1878	Sailing vessel (schooner)	Cardiff	Penzance
1199	*Adelaide*	Off Bute Jetty, Cardiff, Glamorgan	1878	Sailing vessel (schooner)	Cardiff	Portsmouth

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1200	*George Brown*	Angle Bay, Milford Haven	1878	Sailing vessel (schooner)	Cardiff	Kinsale
1201	*Minerva*	Caldey Roads, Bristol Channel	1878	Sailing vessel (schooner)	Cardiff	Lanzarotte, Canary Islands
1202	*Alice*	Little Haven, Pembrokeshire	1878	Sailing vessel (smack)	Little Haven	Porth Claith
1203	*Ann*	Dutchman Bank, Menai Strait, Anglesey	1878	Sailing vessel (flat)	Liverpool	Beaumaris
1204	*Feronia*	Wolves Rocks, Lavernock Point, Bristol Channel	1878	Sailing vessel (brigantine)	Newport	Belfast
1205	*Elizabeth Mary*	Scarweather Lightship (5m W x S), Bristol Channel	1878	Sailing vessel (ketch)	Newport	Tuckenhay, Devon
1206	*Heligan*	Bristol Channel (15m SW of Lundy)	1878	Sailing vessel (schooner)	Newport	Gweek, Cornwall
1207	*John & Susan*	Bristol Channel (20m SE of St Anne's Head)	1878	Sailing vessel (schooner)	Newport	Cork
1208	*Moderator*	Porthkerry Beach, 9m SW of Cardiff, Glamorgan	1878	Sailing vessel (sloop)	Newport	Highbridge
1209	*Royal Ann*	0.5m off Penarth lifeboat house, Glamorgan	1878	Sailing vessel (trow)	Penarth	Bristol
1210	*Pearl*	Scarweather Sands, Bristol Channel	1878	Sailing vessel (schooner)	Porthcawl	Hayle
1211	*Bessie*	Off Barry Island, Barry, Glamorgan	1879	Sailing vessel (brigantine)	Cardiff	Cadiz
1212	*Bacchus*	Penarth Roads, Cardiff, Glamorgan	1879	Sailing vessel (trow)	Cardiff	Bristol
1213	*Agenoria*	Point Lynas (10m off), Anglesey	1879	Sailing vessel (schooner)	Garston	Rostrevor
1214	*Gomer*	Gt Orme's Head (5m WNW of), Denbighshire	1879	Sailing vessel (smack)	Liverpool	Llanbedrog
1215	*Shields*	6m ESE of Nash Lighthouse, Glamorgan	1879	Sailing vessel (brig)	Newport	Cork
1216	*Dundrennan*	Flat Holm Lighthouse (3m NNW of), Bristol Channel	1879	Sailing vessel (brigantine)	Newport	Cork
1217	*Alpha*	Portishead (0.25m NW of), Bristol Channel	1879	Sailing vessel (trow)	Newport	Bristol

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1218	*Sarah Ann*	Swansea Bay, Glamorgan	1879	Sailing vessel (barque)	Swansea	Montivideo
1219	*Thessalia*	Barry Island, Barry, Glamorgan	1880	Sailing vessel (brig)	Cardiff	Constantinople
1220	*Sylvanus*	Caldy Island (off), Pembrokeshire	1880	Sailing vessel (schooner)	Cardiff	Waterford
1221	*Sylvanus*	Caldy Island (off), Bristol Channel	1880	Sailing vessel (schooner)	Cardiff	Waterford
1222	*Morriston*	Church Bay Beach, Anglesey	1880	Sailing vessel (sloop)	Liverpool	Church Bay, Anglesey
1223	*Nymph*	Hell's Mouth, Porth Neigwl, Tremadog Bay, Caernarfonshire	1880	Sailing vessel (schooner)	Llanelli	Newry
1224	*William & Caroline*	Skokholm Island, Pembrokeshire	1880	Sailing vessel (smack)	Milford Haven	Caernarfon
1225	*Brothers*	Cardiff Sands, Glamorgan	1880	Sailing vessel (schooner)	Newport	Ballinacurra
1226	*Ann & Mary*	Pwllgwaylod Bay, Fishguard	1880	Sailing vessel (smack)	Newport	Pwllgwaylod
1227	*Unity*	1m S of Sully Island, Lavernock Point, Glamorgan	1880	Sailing vessel (smack)	Newport	Barnstaple
1228	*Earl of Glasgow*	Ramsey Island (near), 12m WNW of Milford	1881	Sailing vessel (smack)	Briton Ferry	Caernarfon
1229	*Water Lily*	West Scar Light vessel (7m W of), Bristol Channel	1881	Sailing vessel (brigantine)	Cardiff	Waterford
1230	*Alexander*	Bristol Channel (52m SW of)	1881	Sailing vessel (fully rigged ship)	Cardiff	Rio de Janeiro, Brazil
1231	*Achilles*	West Mud, Cardiff, Glamorgan	1881	Sailing vessel (ketch)	Newport	Padstow
1232	*All Right*	Cardigan Bay Light Vessel (15m W of)	1881	Sailing vessel (smack)	Porthcawl	Aberaeron
1233	*Ballindalloch*	Hats and Barrels Rocks, The Smalls, Pembrokeshire	1881	Sailing vessel (schooner)	Swansea	New Ross
1234	*Jane Jones*	Porth Dinllaen (6m off), Caernarfonshire	1881	Sailing vessel (schooner)	Swansea	Caernarfon
1235	*Petroslava*	Milford Haven (2m W of entrance)	1882	Sailing vessel (barque)	Cardiff	Pola, Austria
1236	*Florist*	Cardigan Bay Light Vessel (4m SW of)	1882	Sailing vessel (brigantine)	Cardiff	Belfast

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1237	*Dordogne*	The Mumbles (10m S of), Bristol Channel	1882	Sailing vessel (schooner)	Cardiff	Bannow, Co. Wexford
1238	*Weaver*	Porthor Bay beach, Lleyn Peninsula, Caernarfonshire	1882	Sailing vessel (schooner)	Liverpool	Porthor
1239	*Myrtle*	Minehead (off), Somerset	1882	Sailing vessel (schooner)	Llanelli	Youghall
1240	*David*	Ramsey Sound, Saint David's Head, Pembrokeshire	1882	Sailing vessel (sloop)	Milford Haven	Cardigan
1241	*Hardware*	The Holmes (near), Bristol Channel	1882	Sailing vessel (brigantine)	Newport	Queenstown
1242	*Charles Phillips*	Porlock Bay, Somerset	1882	Sailing vessel (smack)	Newport	Lynmouth
1243	*Tartar*	Minehead (off), Somerset	1882	Sailing vessel (smack)	Newport	Watchet
1244	*Vigour*	Porth Ysgadon (2.5m NNW of), Caernarfonshire	1882	Sailing vessel (sloop)	Runcorn	Porthgolman
1245	*Maiden Oak*	Clevedon Pier (off), Severn Estuary	1883	Sailing vessel (sloop)	Cardiff	Bristol
1246	*Solferino*	Harroldstone Cliffs, St Brides Bay, Pembrokeshire	1883	Sailing vessel (schooner)	Newport	Newry
1247	*Taunton Packet*	South Bishop Lighthouse (2m off), Pembrokeshire	1883	Sailing vessel (schooner)	Newport	New Ross
1248	*Avon*	Walton Bay, Clevedon, Severn Estuary	1883	Sailing vessel (unspecified)	Newport	Bristol
1249	*Celeste*	Skomer Island (2m NW of)	1883	Sailing vessel (chasse-maree)	Pembrey	Isigny, France
1250	*Alexandre*	Lydstip Bay, Tenby	1883	Sailing vessel (dandy)	Porthcawl	Penzance
1251	*Lord Marmion*	West Scar Light Ship (off), Bristol Channel	1883	Sailing vessel (barque)	Swansea	Valparaiso
1252	*Excelsior*	St Anne's Head (4m SW of) Pembrokeshire	1883	Sailing vessel (schooner)	Swansea	Larne
1253	*Robert Williams*	Near Oxwich Point, Glamorgan	1883	Sailing vessel (schooner)	Swansea	Abersoch
1254	*Reine des Fleurs*	West Cross, Gower	1883	Sailing vessel (brigantine)	Swansea	Cannes
1255	*Miningu*	Aberdaron Bay, Caernarfonshire	1884	Sailing vessel (barque)	Cardiff	Rio de Janeiro

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1256	*Samuel*	East side of Worms Head, Glamorgan	1884	Sailing vessel (barque)	Cardiff	Santos, Brazil
1257	*Excel*	Off Port Tennant, Swansea Bay, Glamorgan	1884	Sailing vessel (schooner)	Cardiff	Plymouth
1258	*Sarah & Mary*	Dinas, Caernarfon, Caernarfonshire	1884	Sailing vessel (schooner)	Cardiff	Bangor
1259	*Sarah*	New Passage (near), River Severn	1884	Sailing vessel (trow)	Cardiff	Gloucester
1260	*Gipsy*	Llandudno (near), Great Orme's Head, Denbighshire	1884	Sailing vessel (schooner)	Liverpool	Beaumaris
1261	*Sparfven*	St Anne's Head (8m SE-E of) Pembrokeshire	1884	Sailing vessel (schooner)	Llanelli	Tralee
1262	*Rapid*	Fishguard Rocks, Pembrokeshire	1884	Sailing vessel (smack)	Milford Haven	Cardigan
1263	*Moel Rhiwan*	The Smalls Lighthouse (7m NE of), Pembrokeshire	1884	Sailing vessel (barque)	Newport	Valparaiso
1264	*Fanny*	Bristol Channel (between Newport Road and Usk Light Vessel)	1884	Sailing vessel (ketch)	Newport	Bristol
1265	*Mary*	Monkstone Beacon (1.5m NE of), Bristol Channel	1884	Sailing vessel (schooner)	Newport	Cork
1266	*Caroline*	Porthcawl (Tusker Rock, Glamorgan	1884	Sailing vessel (ketch)	Port Talbot	Bridgwater
1267	*Morning Star*	Tenby (near)	1884	Sailing vessel (unspecified)	Swansea	London
1268	*Haba*	Bardsey Island (near), Lleyn Peninsula, Caernarfonshire	1885	Sailing vessel (brigantine)	Cardiff	Belfast
1269	*Loyalty*	Newton Noyes, Milford Haven	1885	Sailing vessel (schooner)	Cardiff	Holyhead
1270	*Hope*	Puffin Island, Anglesey	1885	Sailing vessel (ketch)	Runcorn	Pentewan
1271	*Teviotdale*	Cefn Sidan Sands, Carmarthen	1886	Sailing vessel (barque)	Cardiff	Bombay
1272	*Railway*	Entrance of River Ely, Penarth, Glamorgan	1886	Sailing vessel (dandy)	Cardiff	Highbridge
1273	*Malleney*	Tusker Rock, near Porthcawl, Glamorgan	1886	Sailing vessel (full rigged ship)	Cardiff	Rio de Janeiro

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1274	*Eliza*	Steep Holm (2.5m SxW of), Bristol Channel	1886	Sailing vessel (schooner)	Cardiff	Bridgwater
1275	*Queen*	Milford Haven	1886	Sailing vessel (ketch)	Hook, Milford	Truro
1276	*Glyndwr*	Hilbre Island, River Dee	1886	Sailing vessel (schooner)	Liverpool	Church Bay, Cemaes
1277	*Wish*	Milford Haven	1886	Sailing vessel (brig)	Newport	Waterford
1278	*Elvina*	Milford Haven (off)	1886	Sailing vessel (ketch)	Newport	Dunmore East, near Waterford
1279	*Paul & Marie*	Penarth Roads, Cardiff, Glamorgan	1886	Sailing vessel (schooner)	Newport	La Roche
1280	*Ben-Y-Gloe*	Near Nash Point, Glamorgan	1886	Sailing vessel (full rigged ship)	Penarth	Singapore
1281	*Rover*	Marros Beach, Carmarthen Bay	1886	Sailing vessel (schooner)	Saundersfoot	Wexford
1282	*Rochford*	Saundersfoot Bay, Carmarthen	1886	Sailing vessel (smack)	Saundersfoot	Fethard, Co. Wexford
1283	*Ocean Beauty*	Mumbles Roads, Swansea Bay, Glamorgan	1886	Sailing vessel (barque; composite)	Swansea	Valparaiso
1284	*John & Ann*	Pwhelli (near), Tremadog Bay, Caernarfonshire	1886	Sailing vessel (schooner)	Swansea	Conway
1285	*John Hall*	Angle (off), Milford Haven	1886	Sailing vessel (schooner)	Swansea	New Ross
1286	*Dovey Packet*	Abercastle (off), Trevine, Pembrokeshire	1886	Sailing vessel (smack)	Swansea	Newport, Pembrokeshire
1287	*Thomas & Sarah*	14m SW of the Mumbles, Swansea Bay, Glamorgan	1886	Sailing vessel (smack)	Swansea	Falmouth
1288	*Garibaldi*	Porth Ysgaden, Lleyn Peninsula, Caernarfonshire	1886	Sailing vessel (flat)	Widnes	Porth Ysgaden
1289	*Renne*	Overton, Gower	1886	Sailing vessel (barque)	Cardiff	Arachon
1290	*Caterira*	Nash Sands (near), Bristol Channel	1887	Sailing vessel (barque)	Cardiff	Colone
1291	*Gustaff Adolf*	Cardiff Drain, Glamorgan	1887	Sailing vessel (full rigged ship)	Cardiff	Montevideo
1292	*Trevaunance*	East Mud, Cardiff, Glamorgan	1887	Sailing vessel (schooner)	Cardiff	St. Agnes
1293	*Water Lily*	Cardiff Drain, Glamorgan	1887	Sailing vessel (ketch)	Newport	Helford
1294	*Cornucopia*	East Mud, Cardiff, Glamorgan	1887	Sailing vessel (schooner)	Newport	Fremington, Devon

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1295	*I'll Try*	East Mud, Cardiff, Glamorgan	1887	Sailing vessel (schooner)	Newport	Wexford
1296	*Redcliff*	Hats and Barrels Rocks, The Smalls, Pembrokeshire	1887	Sailing vessel (schooner)	Newport	Wexford
1297	*Wasp*	Stackpole Head, Pembrokeshire	1887	Sailing vessel (schooner)	Newport	Wexford
1298	*Northampton*	Bristol Channel (48m W of Lundy)	1888	Sailing vessel (fully rigged ship)	Cardiff	Montevideo, Uruguay
1299	*Ann Sumner*	Newcome Knowle Buoy (1m N of), Liverpool Bay	1888	Sailing vessel (schooner)	Mostyn	Douglas, IoM
1300	*Mercur*	8m SE of Nash Point, Porthcawl, Glamorgan	1888	Sailing vessel (barque)	Newport	Montevideo
1301	*Tilburna*	Nash Sand, Glamorgan	1888	Sailing vessel (yawl)	Newport	Truro
1302	*Grace*	Aberdaron Beach, Lleyn Peninsula, Caernarfonshire	1888	Sailing vessel (flat)	Runcorn	Aberdaron
1303	*Brothers*	Pembroke Dock (in the Channel off)	1889	Sailing vessel (smack)	Hook, Milford Haven	Pembroke Dock
1304	*Africain*	West Scar Lightship (5m SSW of), Bristol Channel	1889	Sailing vessel (brigantine)	Newport	Rochefort
1305	*Celestine*	6m WSW of Mumbles Head, Swansea Bay, Glamorgan	1889	Sailing vessel (schooner)	Newport	L'Orient
1306	*Juno*	Llandudno Bay, Great Ormes Head	1889	Sailing vessel (ketch)	Point of Ayr	Bangor
1307	*Richard*	Three Cliff Bay, Oxwich Point, Glamorgan	1889	Sailing vessel (smack)	Swansea	Glamorganshire
1308	*Louisa*	Mumbles Flats, Swansea Bay, Glamorgan	1889	Sailing vessel (dandy)	Tenby	Bridgwater
1309	*Aalesund*	Penarth Roads, Glamorgan	1890	Sailing vessel (barque)	Cardiff	Camp
1310	*Latona*	St George's Channel (south end, 30m WSW of Tuskar Rock)	1890	Sailing vessel (barque)	Cardiff	Cape Town
1311	*Marie Brockelmann*	Helwick Lightship (8m SWxW of), Bristol channel	1890	Sailing vessel (brig)	Neath	Drogheda
1312	*Conservator*	Hurlstone Point (3m NxE of), Bristol Channel	1890	Sailing vessel (ketch)	Newport	Lynmouth

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1313	*George D. Fullerton*	The Smalls (10m WNW of), Pembrokeshire	1890	Sailing vessel (schooner)	Newport	Cork
1314	*Linnet*	Lavan Sands, Menai Strait, Anglesey	1890	Sailing vessel (smack)	Runcorn	Cardigan
1315	*Arturo*	Near Aberthaw, Nash Point, Glamorgan	1891	Sailing vessel (schooner)	Barry	Santo, Brazil
1316	*Florence*	Clevedon (2m N of), Severn Estuary	1891	Sailing vessel (dandy)	Cardiff	Bristol
1317	*Elizabeth*	Burnham Pier (near), Bridgwater Bay, Somerset	1891	Sailing vessel (smack)	Cardiff	Bridgwater
1318	*Esther*	Flat Holm (3m SW of)	1891	Sailing vessel (trow)	Cardiff	Bridgwater
1319	*St. Anne*	Between Penarth and Lavernock Point, Glamorgan	1891	Sailing vessel (brigantine)	Newport	Pouliguen, France
1320	*Boadicea*	St George's Channel (S end)	1891	Sailing vessel (dandy)	Newport	Cork
1321	*Florence*	Bristol Channel (25m S of The Smalls)	1891	Sailing vessel (schooner)	Newport	Cork
1322	*Frederic William*	East Flats, Cardiff, Glamorgan	1891	Sailing vessel (schooner)	Newport	Padstow
1323	*H.L.C.*	Mixon Sands, Swansea Bay, Glamorgan	1891	Sailing vessel (brigantine)	Port Talbot	Pornic, France
1324	*Carl*	East Pier, Swansea, Glamorgan	1891	Sailing vessel (brig)	Swansea	Rio de Janeiro
1325	*Earl of Aberdeen*	Hats and Barrels Rocks, The Smalls, Pembrokeshire	1892	Sailing vessel (fully rigged ship)	Barry	Montevideo
1326	*Candace*	St Govan's Head (10m SSW of), Bristol Channel	1892	Sailing vessel (ketch)	Cardiff	Porthmadog
1327	*Lizzy*	Nash Sands, Glamorgan (possible)	1892	Sailing vessel (schooner)	Cardiff	Pentewan
1328	*Eclipse*	Cumberland Basin, Bristol	1892	Sailing vessel (ketch)	Newport	Bristol
1329	*Duke*	Cardigan Bar	1892	Sailing vessel (schooner)	Point of Ayr, Flintshire	Cardigan
1330	*Thomas*	St Govan's Head (10m SSW of), Bristol Channel	1892	Sailing vessel (smack)	Porthcawl	Aberaeron

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1331	*Hannah & Joseph*	NW Lightship (5m WxS of), Liverpool Bay	1892	Sailing vessel (flat)	Widnes	Beaumaris
1332	*Lerry*	Aberystwyth Harbour entrance	1893	Sailing vessel (sloop)	Cardiff	Aberystwyth
1333	*Margaret & Elizabeth*	Penlas Rock, Menai Strait, Anglesey	1893	Sailing vessel (schooner)	Glasgow	Caernarfon
1334	*Althea*	Oxwich Bay (Nichalston Pill), Glamorgan	1893	Sailing vessel (barque)	Swansea	Christiania, Norway
1335	*Linnet*	Off Penarth Head, Glamorgan	1894	Sailing vessel (brigantine)	Cardiff	Rio de Janeiro
1336	*Brothers*	St Govan's Head (20m SW of), Pembrokeshire	1894	Sailing vessel (ketch)	Cardiff	Waterford
1337	*Industry*	River Avon (entrance), Severn Estuary	1894	Sailing vessel (ketch)	Cardiff	Bristol
1338	*Aurora*	2m S of The Mumbles, Swansea Bay, Glamorgan	1894	Sailing vessel (sloop)	Cardiff	Cardigan
1339	*United Friends*	Oxwich Bay, Glamorgan	1894	Sailing vessel (smack)	Newport	Padstow
1340	*Mary Ann*	English & Welsh Grounds Lightship (0.5m ExN of), Bristol Channel	1894	Sailing vessel (trow)	Newport	Bristol
1341	*Thomas Mason*	West Hoyle Bank, Liverpool Bay	1894	Sailing vessel (schooner)	Runcorn	Nevin, Caernarfonshire
1342	*Active*	Gore Sand, Bridgwater Bay, Bristol Channel	1895	Sailing vessel (ketch)	Cardiff	Bridgwater
1343	*Emily & Louisa*	Bristol Channel	1895	Sailing vessel (schooner)	Cardiff	Youghal
1344	*Philanthropist*	Penarth Mud, Penarth, Glamorgan	1895	Sailing vessel (schooner)	Cardiff	Waterford
1345	*Druid*	Steep Holm (2m SSW of), Bristol Channel	1895	Sailing vessel (trow)	Cardiff	Bridgwater
1346	*Gannet*	Watchet (2.5m NW of), Somerset	1895	Sailing vessel (ketch)	Newport	Watchet
1347	*Robert*	Dale Bay, Milford Haven	1895	Sailing vessel (schooner)	Newport	Clonakilty, Cork
1348	*Rajah*	Caldey Island (10m SW of), Tenby	1896	Sailing vessel (fully rigged ship)	Barry	Hong Kong
1349	*East Anglian*	Penarth Head, Barry, Glamorgan	1896	Sailing vessel (barque)	Cardiff	Esquimault
1350	*Saint Petersburg*	West Mud, Cardiff, Glamorgan	1896	Sailing vessel (barque)	Cardiff	

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1351	*Sea King*	Stackpole Cliff, Saint Govan's Head, Pembrokeshire	1896	Sailing vessel (barque)	Cardiff	Bahia, Brazil
1352	*Venus*	Skomer Island (S Point), St Ann's Head, Pembrokeshire	1896	Sailing vessel (barque)	Cardiff	Lisbon
1353	*I'll Away*	Cardiff Drain, Glamorgan	1896	Sailing vessel (schooner)	Cardiff	Par, Cornwall
1354	*Union*	West Mud, Cardiff, Glamorgan	1896	Sailing vessel (smack)	Cardiff	
1355	*Maria*	Great Ormes Head (7m NW of), Denbighshire	1896	Sailing vessel (schooner)	Liverpool	Aberdaron
1356	*Guarany*	W side fo Sully Island, Glamorgan	1896	Sailing vessel (barque)	Newport	Buenos Aires
1357	*Pickwick*	Culer Sands, Bristol Channel	1896	Sailing vessel (ketch)	Newport	Bridgwater
1358	*John*	English & Welsh Grounds Lightship, Bristol Channel	1896	Sailing vessel (sloop)	Newport	Pill
1359	*William & Margaret*	3-4m SE of Nash Point Lighthouse, Glamorgan	1896	Sailing vessel (smack)	Newport	Aberystwyth
1360	*Catherine*	Mumbles Beach, Swansea Bay, Glamorgan	1896	Sailing vessel (smack)	Porthcawl	Mumbles
1361	*Paquebot de Brest*	1m NE of Mumbles Head, Glamorgan	1897	Sailing vessel (schooner)	Briton Ferry	St. Brieux, France
1362	*Jane Morgans*	Back of E Pier, Swansea, Glamorgan	1897	Sailing vessel (schooner)	Newport	Waterford
1363	*Margaretta*	Pwllgwaelod Beach, Dinas, Pembrokeshire	1897	Sailing vessel (smack)	Porthcawl	Aberayon
1364	*Conway's Pride*	Llanddulas, Abergele Road, Denbighshire	1897	Sailing vessel (ketch)	Runcorn	Port Galmon, Caernarvon
1365	*Wellington*	East Hoyle Bank, River Dee	1897	Sailing vessel (schooner)	Runcorn	Malltraeth, Anglesey
1366	*Victory*	Outside Neath Bar, Neath, Swansea Bay, Glamorgan	1898	Sailing vessel (smack)	Briton Ferry	Bideford
1367	*Griqualand West*	Near Breaksea Point, Nash Point, Glamorgan	1898	Sailing vessel (schooner)	Cardiff	Youghal
1368	*Lord Exmouth*	Ramsey Sound (near Horse Rock), Pembrokeshire	1898	Sailing vessel (smack)	Hook	Fishguard

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1369	*Friends*	Point Lynas (5m SE of), Anglesey	1898	Sailing vessel (smack)	Liverpool	Cemaes, Anglesey
1370	*John & Ann*	Goodwick Sands, Fishguard	1898	Sailing vessel (ketch)	Newport	Goodwick
1371	*Charlotte*	Upper Hook Buoy (0.5m W of), Bristol Channel	1898	Sailing vessel (sloop)	Penarth	Bristol
1372	*Lydia*	Mostyn Bank, River Dee, Flintshire	1898	Sailing vessel (flat)	Point of Ayr	Flint
1373	*Ohr*	7m W 0.5m S of West Scar Lightship, Glamorgan	1899	Sailing vessel (barque)	Cardiff	Bahia Blanca
1374	*Margaret*	Skomer Island (5m NNW of), St Bride's Bay	1899	Sailing vessel (schooner)	Cardiff	Aberaeron
1375	*George Canning*	1m ESE of Scarweather Lightship, Port Talbot, Glamorgan	1899	Sailing vessel (schooner)	Neath Abbey	Watchet
1376	*Avola*	Pendine Sands, Carmarthen	1899	Sailing vessel (brigantine)	Newport	Para, Brazil
1377	*Three Sisters*	Between Mumbles and Mixon (nr Greengrounds), Swansea Bay, Glamorgan	1899	Sailing vessel (ketch)	Port Talbot	Llangranog
1378	*Cashier*	St Bride's Bay, Pembrokeshire	1900	Sailing vessel (barque)	Cardiff	Madagascar
1379	*Ragna*	Aberfelin Creek, Trevine, Pembrokeshire	1900	Sailing vessel (barque)	Cardiff	Bahia, Brazil
1380	*Glenora*	Cardiff Sands, Glamorgan	1900	Sailing vessel (ketch)	Cardiff	Youghal
1381	*Hovding*	Welsh Hook Sand, Bristol Channel	1900	Sailing vessel (barque)	Newport	Maceio
1382	*Tenax Propositi*	Welsh Hook Sand, Bristol Channel	1900	Sailing vessel (barque)	Newport	Paramaribo
1383	*Tordenskjold*	Welsh Hook Sand, Bristol Channel	1900	Sailing vessel (barque)	Newport	St. Panlode Loando
1384	*Onward*	River Dee estuary (2m NE of, near the West Hoyle Bank), Flintshire	1900	Sailing vessel (flat)	Point of Ayr	Flint
1385	*Eva Lena*	Llandudno, Caernarfonshire	1900	Sailing vessel (flat)	Runcorn	Port Dinorwic

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1386	*Africa*	Bristol Channel (between Helwick Sand Lightship and Ilfracombe	1901	Sailing vessel (barque)	Cardiff	Pernambuco
1387	*Australia*	4m W of Ferryside, Carmarthen Bay, Carmarthen	1901	Sailing vessel (fully rigged ship)	Cardiff	Rio de Janeiro
1388	*William*	Gore Sand, River Parret, Bristol Channel	1901	Sailing vessel (ketch)	Newport	Bridgwater
1389	*Thomas*	Salisbury Bank, River Dee	1901	Sailing vessel (schooner)	Point of Ayr	Caernarfon
1390	*Hope*	St Anne's Head (5m SE of), Pembrokeshire	1901	Sailing vessel (schooner)	Port Talbot	Arklow
1391	*Shirley*	Cardiff Sand, Glamorgan	1902	Sailing vessel (schooner)	Cardiff	Penryn
1392	*Mary Sutherland*	Porth Pistill (?), Anglesey	1902	Sailing vessel (smack)	Liverpool	Porth Pistill (?)
1393	*Sator*	Monkstone Rock, off Penarth, Glamorgan	1902	Sailing vessel (barque)	Newport	Guadeloupe
1394	*Charles Walker*	St Govan's Head (off), Pembrokeshire	1902	Sailing vessel (schooner)	Newport	Wexford
1395	*Pecheries Fransaises No. 17*	Horse Rock, Ramsey Sound, Pembrokeshire	1902	Sailing vessel (ketch)	Pembrey	Dinas Cross
1396	*Friendship*	Sully Island, Barry, Glamorgan	1902	Sailing vessel (ketch)	Penarth	Fremington
1397	*Heroine*	Angle Bay, Milford Haven, Pembrokeshire	1903	Sailing vessel (ketch)	Burry Port	
1398	*Corby Castle*	Point of Ayr (off, probably on edge of the Welsh Bank), Flintshire	1903	Sailing vessel (schooner)	Glasson Dock, Lancashire	Amlch
1399	*Caliban*	Greenfield Bank, Flintshire	1903	Sailing vessel (flat)	Greenfield Dock, Flintshire	
1400	*Mark*	Flint Gutter entrance, River Dee, Flintshire	1903	Sailing vessel (flat)	Mostyn	Flint
1401	*Rubens*	St Anne's Head (1m SW of), Pembrokeshire	1903	Sailing vessel (barque)	Newport	Oporto, Portugal
1402	*Ouse*	Penarth Roads, Glamorgan	1903	Sailing vessel (ketch)	Newport	Bideford

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1403	*Economist*	7m SW/S of Nash Point Lighthouse, Glamorgan	1903	Sailing vessel (schooner)	Newport	Wexford
1404	*Stag*	Llandudno Bay, Caernarfonshire	1903	Sailing vessel (cutter)	Point of Ayr	Bangor
1405	*Star*	Flint (off), River Dee, Flintshire	1903	Sailing vessel (ketch)	Poit of Ayr	Flint
1406	*Charles*	Mumbles Flats, Swansea Bay, Glamorgan	1903	Sailing vessel (ketch)	Swansea	Isigny, France
1407	*Esperanza*	St George's Channel (S end)	1904	Sailing vessel (brig)	Cardiff	Waterford
1408	*Ocean Child*	Flat Holm (1m WNW of Elbow Buoy), Bristol Channel	1904	Sailing vessel (ketch)	Cardiff	Gloucester
1409	*Happy Return*	Walton Bay, Somerset	1904	Sailing vessel (sloop)	Cardiff	Bristol
1410	*Gazelle*	Clevedon Pier (0.5m W of), Severn Estuary	1904	Sailing vessel (ketch)	Newport	Bristol
1411	*Crown*	Aberdaron Beach, Lleyn Peninsula, Caernarfonshire	1904	Sailing vessel (ketch)		Aberdaron Beach
1412	*Queen of the Chase*	Cardiff Roads, Glamorgan	1905	Sailing vessel (schooner)	Cardiff	Penryn
1413	*Exeter*	Clevedon Flat Buoy (1m WxS of), Bristol Channel	1905	Sailing vessel (trow)	Cardiff	Gloucester
1414	*Confidence*	Porth-clais (near), Pembrokeshire	1905	Sailing vessel (schooner)	Hook	Porth-clais
1415	*Hector*	Dutchman Bank (E end), Menai Strait, Anglesey	1905	Sailing vessel (schooner)	Point of Ayr	Bangor
1416	*Skylark*	Near the Mumbles, Glamorgan	1905	Sailing vessel (ketch)	Swansea	Killorglin
1417	*Julia*	Port Mendwy (near), Aberdaron, Caernarfonshire	1905	Sailing vessel (schooner)		Porth Mendwy
1418	*Benjamin Boyd*	Cardiff channel entrance, Glamorgan	1906	Sailing vessel (schooner)	Cardiff	Ballinacurra
1419	*Ann*	Between Fishguard and Cardigan (10-12m off), Cardiganshire	1906	Sailing vessel (smack)	Milford Haven	Newport
1420	*William Keith*	The Smalls Lighthouse (off), Pembrokeshire	1906	Sailing vessel (schooner)	Swansea	Dingle
1421	*Jantina*	Benllech beach, Red Wharf Bay, Anglesey	1906	Sailing vessel (ketch)		Benllech beach, Anglesey

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1422	*Dei Gratia*	Black Rock, W Dale Roads, Milford Haven, Pembrokeshire	1907	Sailing vessel (brigantine)	Cardiff	Youghal
1423	*Tillie E.*	Kenfig Beach, Glamorgan	1907	Sailing vessel (schooner)	Llanelli	Littlehampton
1424	*Tregunnel*	Bristol Channel	1907	Sailing vessel (schooner)	Newport	Dungarvan
1425	*Ann*	Breaksea Point, Nash Point, Glamorgan	1907	Sailing vessel (ketch)	Swansea	Bridgwater
1426	*Bougainville*	4m SW of Oxwich Point, Glamorgan	1907	Sailing vessel (schooner)	Swansea	Mortagne, France
1427	*Enterprise*	Barafundle Bay, Stackpole Head, Pembrokeshire	1907	Sailing vessel (schooner)	Swansea	New Ross
1428	*Verajean*	Rhoose Point, Barry, Glamorgan	1908	Sailing vessel (fully rigged ship)	Cardiff	Molendo, South America
1429	*Rhymney*	Portishead (near Firelly Buoy), Severn Estuary	1908	Sailing vessel (schooner)	Cardiff	Avonmouth
1430	*Superb*	Llanerch-y-mor, Mostyn, River Dee, Flintshire	1908	Sailing vessel (flat)	Llanerch-y-Mor	
1431	*Amazon*	Margam Sands, Port Talbot, Glamorgan	1908	Sailing vessel (barque)	Port Talbot	Iquique, Chile
1432	*Seven Brothers*	Aberaeron (500m N of), Cardiganshire	1909	Sailing vessel (schooner)	Cardiff	Aberaeron
1433	*Samuel*	Great Ormes Head (6m ENE of), Caernarfonshire	1909	Sailing vessel (smack)	Garston & Liverpool	Beaumaris
1434	*Nouvelle Marie*	Castle Rock, Porthkerry Bay, Breaksea Point, Glamorgan	1909	Sailing vessel (schooner)	Newport	Bude
1435	*Sprightly*	Bristol Channel	1909	Sailing vessel (sloop)	Swansea	Watchet
1436	*Mary Elizabeth*	Bardsey Island, Caernarfonshire	1910	Sailing vessel (ketch)	Liverpool	Bardsey Island
1437	*Lady Fielding*	Aberdaron (2m E of), Caernarfonshire	1910	Sailing vessel (schooner)	Swansea	Llanidan, Anglesey
1438	*Great Britain*	St George's Channel (11m SWxS of Bardsey Island)	1911	Sailing vessel (jigger)	Liverpool	Rhiw & Aberdaron
1439	*Volunteer*	Culver Sands, Bristol Channel	1911	Sailing vessel (ketch)	Newport	Isles of Scilly

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1440	*Gem*	0.5m E of Pwlldu Head, Oxwich Point, Glamorgan	1911	Sailing vessel (schooner)	Port Talbot	Plymouth
1441	*Fox*	Saddle Point, Fishguard, Pembrokeshire	1911	Sailing vessel (schooner)	Runcorn	Pentewan
1442	*Sicie*	Helwick Lightship (near)	1911	Sailing vessel (brigantine)	Swansea	Lorient, France
1443	*Arsene*	Off Penmark, Glamorgan	1912	Sailing vessel (brigantine)	Swansea	Pornic, France
1444	*Margaret & Elizabeth*	Rhiw Pier, Aberdaron, Caernarfonshire	1912	Sailing vessel (ketch)	Rhiw	
1445	*Thomas & Sons*	Burry Inlet, Carmarthen Bay, Carmarthen	1913	Sailing vessel (ketch)	Burry Port	Dinas
1446	*Pirate*	1.5m SW of Lavernock Point, Penarth, Glamorgan	1913	Sailing vessel (ketch)	Cardiff	Bideford
1447	*Eliza Jane*	Llangranog Beach, Cardigan Bay, Cardiganshire	1913	Sailing vessel (ketch)	Swansea	Llangranog
1448	*Empire*	West Scar Lightship (8m E of), Bristol Channel	1913	Sailing vessel (ketch)	Swansea	Highbridge
1449	*Lenora/Leonora*	Rotherslade, near the Mumbles, Glamorgan	1913	Sailing vessel (ketch)	Swansea	Barnstaple
1450	*Annie Heron*	Port Ysgaden Cove, Caernarfonshire	1914	Sailing vessel (schooner)	Liverpool	Porth Ysgaden
1451	*Elizabeth Jane*	6 cables NE of Mumbles Head, Swansea Bay, Glamorgan	1914	Sailing vessel (schooner)	Cardiff	Waterford
1452	*Crown of India*	Saint Ann's Head, St George's Channel	1915	Sailing vessel (barque)	Barry	Pernambuco, Brazil
1453	*Clara*	Cardigan Bay (on the coast), Cardiganshire	1915	Sailing vessel (ketch)	Hook	St Dogmaels
1454	*Faith*	St Anne's Head (0.25m SW of), Pembrokeshire	1916	Sailing vessel (schooner)	Cardiff	Wexford
1455	*Indiana*	Bristol Channel	1916	Sailing vessel (schooner)	Cardiff	La Rochelle
1456	*Saint Joseph*	Bristol Channel	1916	Sailing vessel (schooner)	Cardiff	Bordeaux
1457	*Inverlogie*	St George's Channel (15m SW of the Smalls)	1917	Sailing vessel (barque)	Barry	Archangel, Russia

WA No.	Name of vessel	Loss location	Loss date	Vessel type	Voyage from	Voyage to
1458	*Charles Martel*	5m S of Worms Head, Glamorgan	1917	Sailing vessel (dandy)	Swansea	St. Servan
1459	*Falcon*	Foreland Point (off), Bristol Channel	1917	Sailing vessel (schooner)	Newport	New Ross
1460	*Jane Knox*	Rhwchiwns Point, Porthcawl, Glamorgan	1917	Sailing vessel (schooner)	Briton Ferry	St. Brieuc
1461	*Galley*	Clevedon Pier (8m W of), Somerset	1917	Sailing vessel (smack)	Newport	Bristol
1462	*Finistere*	Bristol Channel	1918	Sailing vessel (barque)	Cardiff	Bordeaux, France
1463	*Pelerin*	South Dock Jetty, Swansea, Glamorgan	1918	Sailing vessel (dandy)	Swansea	Paimpol
1464	*Jane Gray*	The Smalls (14m NWxW of), Pembrokeshire	1918	Sailing vessel (schooner)	Cardiff	Waterford
1465	*Trebiskin*	Mixon Shoal, Mumbles Head, Glamorgan	1918	Sailing vessel (schooner)	Swansea	Youghal
1466	*Energy*	St George's Channel (N end)	1918	Sailing vessel (unspecified)	Holyhead	Youghal, Ireland
1467	*Joseph Fisher*	St George's Channel (N end)	1918	Sailing vessel (unspecified)	Holyhead	Wicklow, Ireland
1468	*Fleur de Mer*	Off Nash Point, Glamorgan	1919	Sailing vessel (schooner or brigantine)	Cardiff	France
1469	*Elizabeth Alice*	Jack Sound, St Anne's Head, Pembrokeshire	1920	Sailing vessel (schooner)	Swansea	Malmo
1470	*Raven*	Near East Pier, Swansea, Glamorgan	1923	Sailing vessel (schooner)	Swansea	St. Brieuc
1471	*Trio*	River Parrett, Bridgwater, Somerset	1939	Sailing vessel (ketch)	Newport	Bridgwater

APPENDIX VII: KNOWN LOSSES OF STEAMSHIPS AND MOTOR VESSELS CARRYING COAL TO OR FROM WALES 1850-1945

WA No.	Name of vessel	Loss location	Date of loss	Vessel type	Construction material	Voyage from	Voyage to
1472	*Golden Fleece*	Sully Island, Lavernock Point	1869	Steamship	Iron	Cardiff	Alexandria
1473	*Fairwater*	Bristol Channel	1870	Steamship	Iron	Cardiff	Cork
1474	*Pallion*	Lundy (7m SW 0.5m W), Bristol Channel	1873	Steamship	Iron	Cardiff	Suez
1475	*Ruby*	Breaksea Point, Barry, Glamorgan	1876	Steamship	Iron	Cardiff	Trouville
1476	*Squirrel*	Nash Point Lighthouse (6m S of), Bristol Channel	1877	Steamship	Iron	Newport	Portreath
1477	*Eagle*	Cardigan (13m WNW of)	1879	Steamship	Iron	Swansea	Dublin
1478	*James Gray*	Tusker Rock, near Porthcawl, Glamorgan	1883	Steamship	Iron	Cardiff	Cape Verde Islands
1479	*Captain McClure*	Hats and Barrels Rocks, The Smalls, Pembrokeshire	1884	Steamship	Iron	Newport	Cork
1480	*Delabole*	Bull Point Lighthouse (6m NE of), Bristol Channel	1884	Steamship	Iron	Newport	Caen, France
1481	*Eliza Hunting*	Culver Sands, Bristol Channel	1885	Steamship	Iron	Cardiff	Port Mazzron, Spain
1482	*Mersey*	Penhros Point, Anglesey	1886	Steamship	Iron	Newport	Liverpool
1483	*Strathallan*	Off Lavernock Point, Glamorgan	1887	Steamship	Iron	Cardiff	St. Malo
1484	*Mary E. Wadham*	St Bride's Bay, Pembrokeshire	1888	Steamship	Iron	Swansea	Belfast
1485	*Mauritania*	Penarth Roads, Glamorgan	1889	Steamship	Iron	Cardiff	Barcelona
1486	*Thunder*	St Govan's Head (2m E of)	1889	Steamship	Iron	Briton Ferry	Belfast
1487	*Angelica*	Breaksea Lightship (off), Bristol Channel	1890	Steamship	Iron	Cardiff	Venice
1488	*Ribble*	St George's Channel (off Arklow Lightship)	1891	Steamship	Iron	Swansea	Newry
1489	*Batavia I*	Foreland Point (7m N of), Bristol Channel	1892	Steamship	Iron	Newport	Antwerp

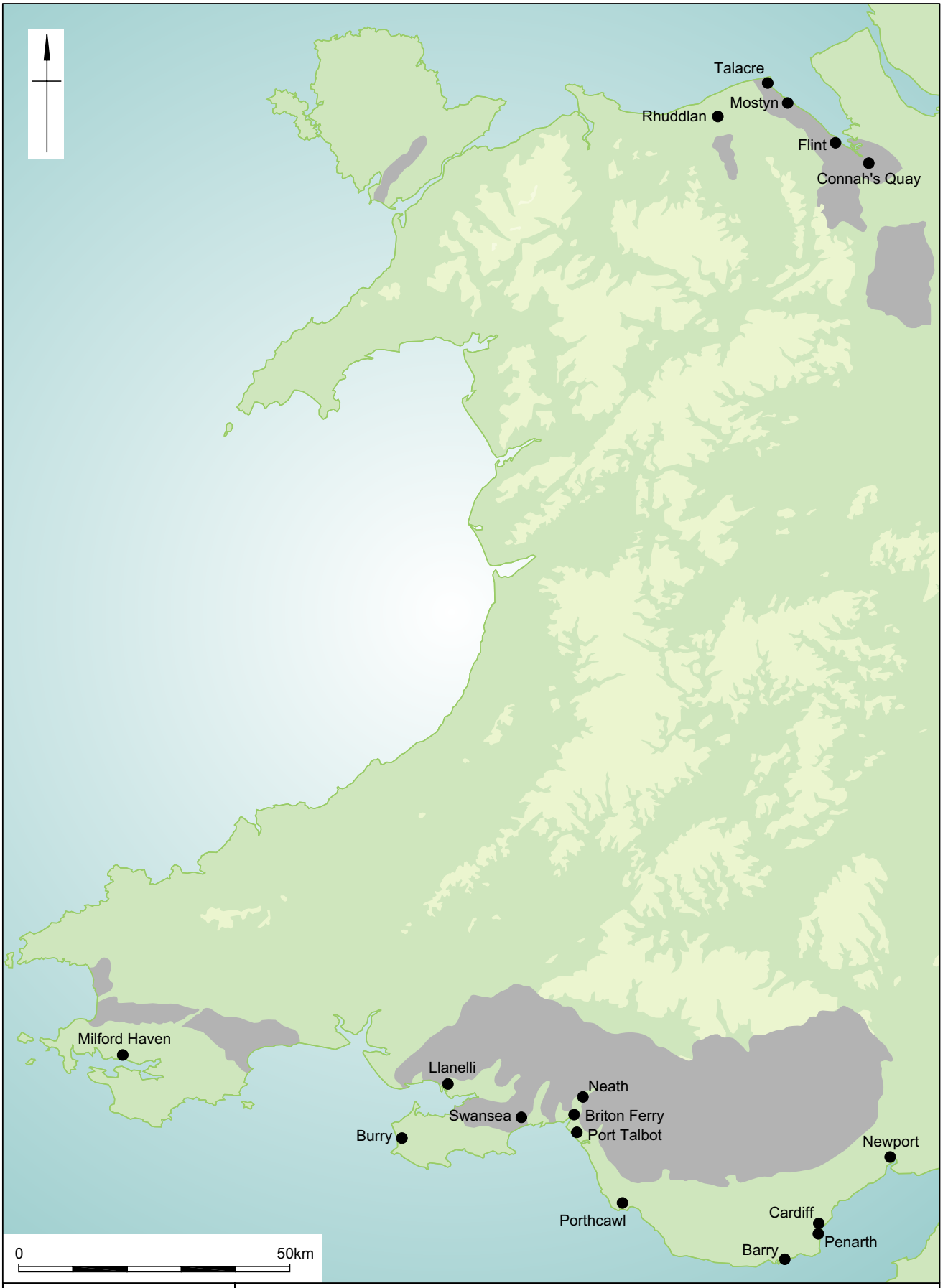
WA No.	Name of vessel	Loss location	Date of loss	Vessel type	Construction material	Voyage from	Voyage to
1490	*Egret*	Cardiff Sands, Glamorgan	1892	Steamship	Iron	Newport	Bilbao
1491	*Musgrave*	Upper Sledge/Uchaf Rock, Near Pen Clegyr, Pembrokeshire	1892	Steamship	Iron	Briton Ferry	Dundalk
1492	*Prospero*	Skokholm Island (S side), Pembrokeshire	1892	Steamship	Steel	Barry	Workington
1493	*Morfa*	North Bishop (0.25m WNW of), Pembrokeshire	1894	Steamship	Iron	Swansea	Belfast
1494	*Zadne*	Lundy (off), Bristol Channel	1894	Steamship	Iron	Britton Ferry	London
1495	*Allendale*	Skokholm Island, Milford Haven	1895	Steamship	Iron	Cardiff	Liverpool
1496	*Clytha*	Barry Roads, Glamorgan	1895	Steamship	Iron	Cardiff	Southampton
1497	*Enterprize*	English & Welsh Grounds Lightship (near), Bristol Channel	1895	Steamship	Iron	Cardiff	Bristol
1498	*Theme*	St George's Channel	1895	Steamship	Steel	Swansea	Belfast
1499	*Tender*	Stert Island (off), Burnham-on-Sea, Somerset	1895	Steamship	Wood	Cardiff	Bridgwater
1500	*Pentland*	In the river, Newport, Monmouth	1896	Steamship	Iron	Newport	Torre, Annunziata
1501	*Netham*	Near River Usk E Buoy, Newport, Monmouth	1898	Steamship	Iron	Newport	Bristol
1502	*Rostrevor*	Ramsey Sound (near Horse Rock), Pembrokeshire	1898	Steamship	Iron	Newport	Belfast
1503	*Aggravator*	Porth Nigel, Caernarfonshire	1898	Steamship	Wood		Porth Nigel, Caernarfonshire (?)
1504	*Aberdare*	1.5m S of Barry Island, Glamorgan	1899	Steamship	Iron	Cardiff	St. Nazaire
1505	*Edith*	2m WNW of Breaksea Lightship, Barry, Glamorgan	1899	Steamship	Steel	Cardiff	Barcelona
1506	*Edith*	Breaksea Point Lightship (2m WNW of), Bristol Channel	1899	Steamship	Steel	Cardiff	Barcelona
1507	*Engineer*	Near Penarth, Glamorgan	1900	Steamship	Iron	Penarth	Savona
1508	*Mistor*	English & Welsh Grounds Lightship (0.75m NW of), Bristol Channel	1900	Steamship	Steel	Newport	Malta
1509	*Antrim*	Bristol Channel	1902	Steamship	Iron	Newport	Belfast

WA No.	Name of vessel	Loss location	Date of loss	Vessel type	Construction material	Voyage from	Voyage to
1510	*Penzance*	Barry Roads, Glamorgan	1902	Steamship	Iron	Barry	Brest
1511	*Heptarchy*	Bristol Channel (12m WNW of Helwick Lightship)	1903	Steamship	Iron	Newport	Waterford
1512	*Arthur*	Sully Island, Barry, Glamorgan	1903	Steamship	Steel	Newport	Dublin
1513	*Arthur*	Sully Island (near), Bristol Channel	1903	Steamship	Steel	Newport	Dublin
1514	*Ierne*	Near Scarweather Bank, Swansea Bay	1903	Steamship	Steel	Newport	Dublin
1515	*Ruperra*	Bishop Rock Lighthouse (14m S of), Pembrokeshire	1903	Steamship	Steel	Barry	Port Said
1516	*Henry Bell*	Whiteford Point Beach, River Lougher, Llanelli, Carmarthen	1904	Steamship	Iron	Llanelli	
1517	*Den of Seaton*	Near Breaksea Lightship, Barry, Glamorgan	1904	Steamship	Steel	London/Newport	Aden
1518	*Den of Seaton*	Breaksea Lightship (near), Bristol Channel	1904	Steamship	Steel	Newport	Aden
1519	*Orianda*	4m SW 0.5m W of Nash Point, Glamorgan	1907	Steamship	Iron	Cardiff	Leghorn
1520	*Orianda*	Nash Point (4m SW of), Bristol Channel	1907	Steamship	Iron	Cardiff	Spezia (Leghorn)
1521	*Enterprize*	Porth Fawr, Caernarfonshire	1909	Steamship	Wood	Point of Ayr	Fishguard
1522	*Dalserf*	Horse Rock, Ramsey Sound, Pembrokeshire	1910	Steamship	Steel	Penarth	Oban
1523	*Pelagos*	Cold Knap Point, Barry, Glamorgan	1912	Steamship	Iron	Barry Docks	Leghorn
1524	*Talbot*	Formby Light vessel (0.5m W of), Liverpool Bay	1912	Steamship	Steel	Cardiff	Birkenhead
1525	*Tenet*	Skokholm Island (3m off), Pembrokeshire	1912	Steamship	Steel	Newport	Londonderry
1526	*Aeolus*	Wolves Rocks, Bristol Channel	1913	Steamship	Steel	Newport	Piraeus & Zea, Greece
1527	*Blue Bell*	Overton Cliffs, Worms Head, Glamorgan	1913	Steamship	Steel	Partington	Swansea

WA No.	Name of vessel	Loss location	Date of loss	Vessel type	Construction material	Voyage from	Voyage to
1528	*Brodland*	Aberavon Beach, Port Talbot, Glamorgan	1913	Steamship	Steel	Port Talbot	Punta Arenas
1529	*Ellerbeck*	Hats and Barrels Rocks, The Smalls, Pembrokeshire	1914	Steamship	Steel	Barry Dock	Pentland Firth
1530	*Corundum*	Helwick Lightship (near)	1914	Steamship	Iron or steel	Burry Port	Rouen, France
1531	*Glenby*	St George's Channel (30m N of the Smalls)	1915	Steamship	Steel	Cardiff	Archangel, Russia
1532	*Hopemount*	Bristol Channel approaches (70m W of Lundy)	1915	Steamship	Steel	Cardiff	Alexandria
1533	*Kirkby*	St George's Channel (20m WSW of Bardsey Island)	1915	Steamship	Steel	Barry	Manchester
1534	*Satrap*	Caldey Island (off), Pembrokeshire	1915	Steamship	Steel	Barry	
1535	*Strath Carrion*	Bristol Channel (60m W of Lundy)	1915	Steamship	Steel	Barry Dock	Zanzibar
1536	*Strathnairn*	St George's Channel (25m NxE of South Bishop Lighthouse	1915	Steamship	Steel	Penarth	Archangel, Russia
1537	*Havet*	1m N of Breaksea Lightship, Barry, Glamorgan	1916	Steamship	Iron	Newport	Rouen
1538	*Ponto*	Barry Roads, Bristol Channel	1916	Steamship	Steel	Cardiff	Rouen
1539	*Taffy*	St Govan's Head (8m S offshore of), Pembrokeshire	1916	Steamship	Steel	Cardiff	Cork
1540	*Artist*	St George's Channel (58m W 0.5m S of the Smalls)	1917	Steamship	Steel	Newport	Alexandria, Egypt
1541	*Bestik*	St George's Channel (40m W of Bishop Rock)	1917	Steamship	Steel	Cardiff	Philippeville, France
1542	*Bestwood*	South Bishop Rock (12m NW of), Pembrokeshire	1917	Steamship	Steel	Cardiff	Milford
1543	*Castledobbs*	St George's Channel (10m SW of South Stack Lighthouse, Anglesey)	1917	Steamship	Steel	Cardiff	Belfast
1544	*Charleston*	St George's Channel (30m W of the Smalls)	1917	Steamship	Steel	Cardiff	Berehaven
1545	*Georgios Markettos*	St Govan's Head Lighthouse (4m off), Pembrokeshire	1917	Steamship	Steel	Newport	Oran

WA No.	Name of vessel	Loss location	Date of loss	Vessel type	Construction material	Voyage from	Voyage to
1546	*Gisella*	St Anne's Head (6m W of; 2m SWxS of Skokholm Island), Pembrokeshire	1917	Steamship	Steel	Cardiff	
1547	*Lord Derby*	St Anne's Head (7m SWxS of), Pembrokeshire	1917	Steamship	Steel	Cardiff	Milford Haven
1548	*Saint Jacques*	St Anne's Head (5m offshore of), Pembrokeshire	1917	Steamship	Steel	Barry	Bizerta
1549	*Dunnet Head*	St Anne's Head (8m WxN of), Pembrokeshire	1918	Steamship	Steel	Barry	Pembroke
1550	*Margaret Ann*	Freshwater Bay, St. Govan's Head, Pembrokeshire	1918	Steamship	Wood	Briton Ferry	Wexford
1551	*Sarpfos*	The Skerries (off), Anglesey	1918	Steamship	Steel	Swansea	Odde
1552	*Carbon*	Peterstone Flats, Newport, Monmouth	1919	Steam powered (Larn - 'BC'?)	Steel	Cardiff	Bristol
1553	*Rosedale*	Bristol Channel	1919	Steamship	Iron & steel	Cardiff	Bordeaux, France
1554	*Merkur*	Near Barry Island, Glamorgan	1920	Steamship	Steel	Barry	Las Palmas
1555	*Marianola*	Bull Point (7m NNW of), Anglesey	1921	Steamship	Steel	Newport	Pasages, Spain
1556	*Hongisto*	Lavernock Point, Penarth, Glamorgan	1924	Steamship	Wood	Newport	Bilbao
1557	*New Glyn*	Llanelli, Carmarthen	1924	Steamship	Steel	Llanelli	Rouen
1558	*Ethel*	Strumble Head (15m NNW of),	1925	Steamship	Iron	Newport	Dublin
1559	*Valsesia*	Friar's Point, Barry, Glamorgan	1926	Steamship	Steel	USA	Barry Docks
1560	*Glanrhyd*	Helwick Lightship (near)?	1938	Steamship	Iron or steel	Newport	Manchester
1561	*Mervyn*	The Smalls (10m SE of), Pembrokeshire	1939	Steamship	Steel	Barry	Lisbon
1562	*Stanholme*	Off Nash Point, Glamorgan	1939	Steamship	Steel	Cardiff	London
1563	*Stanholme*	Nash Point Lighthouse (5.3m 224.5 degrees off), Bristol Channel	1939	Steamship	Steel	Cardiff	London
1564	*Bellerock*	Off Nash Point, Glamorgan	1940	Steamship	Steel	Barry	Corunna
1565	*Bellerock*	Porlock (off), Bristol Channel	1940	Steamship	Steel	Barry	Corunna

WA No.	Name of vessel	Loss location	Date of loss	Vessel type	Construction material	Voyage from	Voyage to
1566	*Leonard Pearce*	Bull Point (9m N of), Bristol Channel	1940	Steamship	Steel	Barry	London
1567	*Philotis*	St Govan's Light Vessel (8m NW of), Pembrokeshire	1940	Steamship	Steel	Swansea	Lisbon
1568	*Slava*	Off Nash Point, Glamorgan	1940	Steamship	Steel	Cardiff	Buenos Aires
1569	*Slava*	Barry (off), Bristol Channel	1940	Steamship	Steel	Cardiff	Buenos Aires
1570	*Stalheim*	0.5m WSW of South Pier, Port Talbot, Glamorgan	1940	Steamship	Steel	Port Talbot and Barry	St John, New Brunswick
1571	*Strombus*	2.2m 112 degrees off Mumbles Head Lighthouse, Glamorgan	1940	Whaling ship	Steel	Swansea	Antartic
1572	*Watkins F. Nisbet*	Malltraeth Bay, Anglesey	1940	Steamship (Canadian Lakes steamer)	Steel		
1573	*Iron Duke*	Bristol Channel	1941	Steamship	Iron	Penarth	Watchet
1574	*Lunan*	Penarth Roads, Glamorgan	1941	Steamship	Steel	Ely Harbour	Portishead
1575	*Matronna*	Dale Roads, Milford Haven, Pembrokeshire	1941	Steamship	Steel	Port Talbot	St Johns, Newfoundland
1576	*Maurita*	Hibre Swash, East Hoyle Bank, River Dee	1941	Steamship	Steel	Point of Ayr	Lancaster
1577	*Millisle*	Helwick Lightship (2m E of), Worm's Head, Bristol Channel	1941	Steamship	Steel	Cardiff	Cork
1578	*Porthmeor*	St George's Channel	1941	Steamship	Steel	Cardiff	Dublin
1579	*Borderdene*	Brean Down (3-4m SW of), Somerset	1942	Steamship	Steel	Newport	Bridgwater
1580	*Quickthorn*	Skokholm Island (near), Milford Haven, Pembrokeshire	1942	Steamship	Steel	Newport	Londonderry
1581	*Clapham*	St Anne's Head (3.75m S of), Pembrokeshire	1943	Steamship	Steel	Cardiff	Belfast
1582	*P.L.M. 21*	Middle Channel Rocks, Milford Haven, Pembrokeshire	1944	Steamship	Steel		Milford Haven
1583	*Antonio*	St Anne's Head (5m off, 31.03 degrees?), Pembrokeshire	1945	Steamship	Steel	Cardiff	Gibraltar



● Ports mentioned in the text
Coal fields

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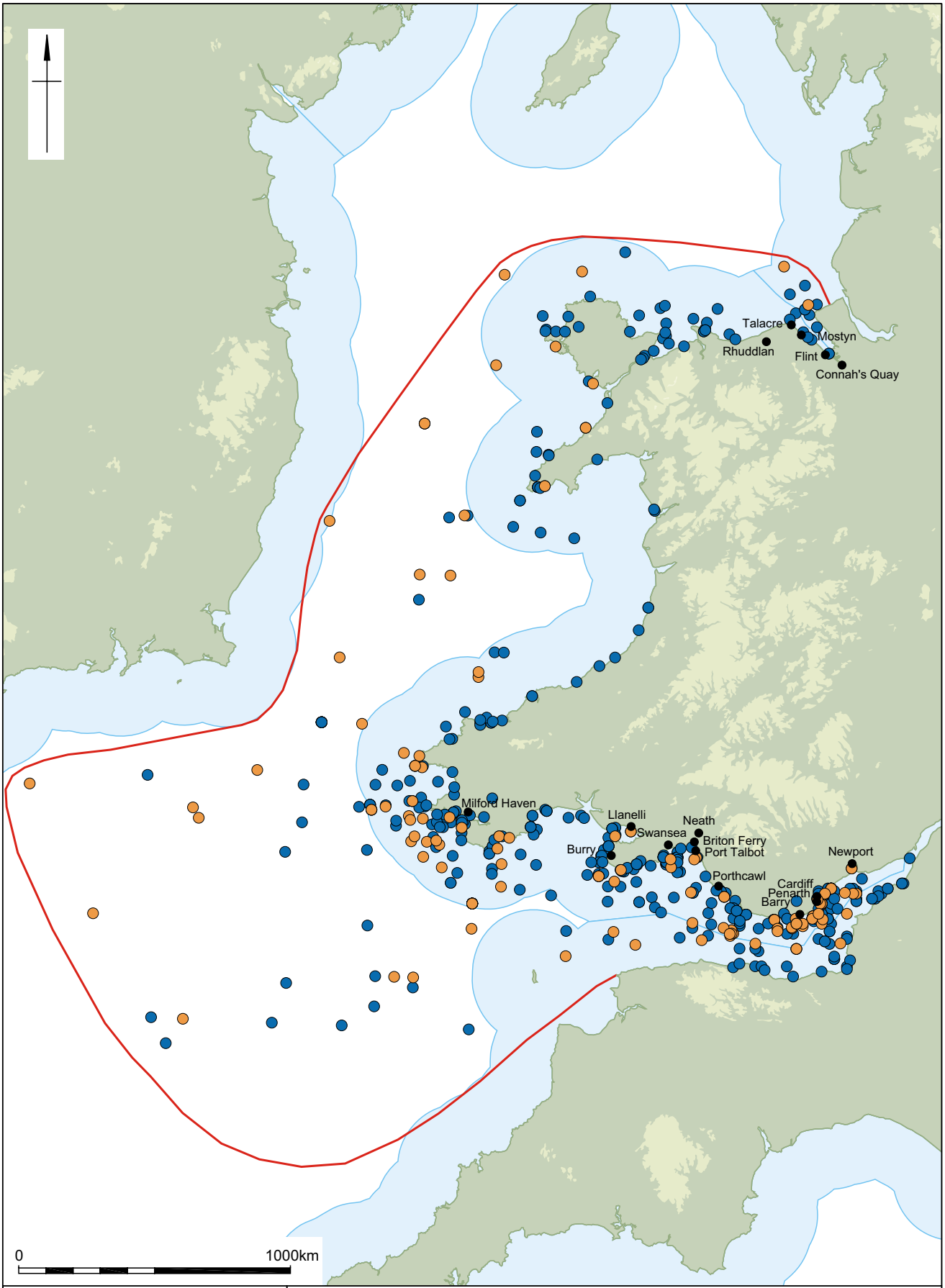
Welsh coal fields and associated coal ports

Figure 1



Approximate limit of Study Area
Ports mentioned in the text
Steamship and motor vessel losses
Sailing vessel losses
Territorial waters

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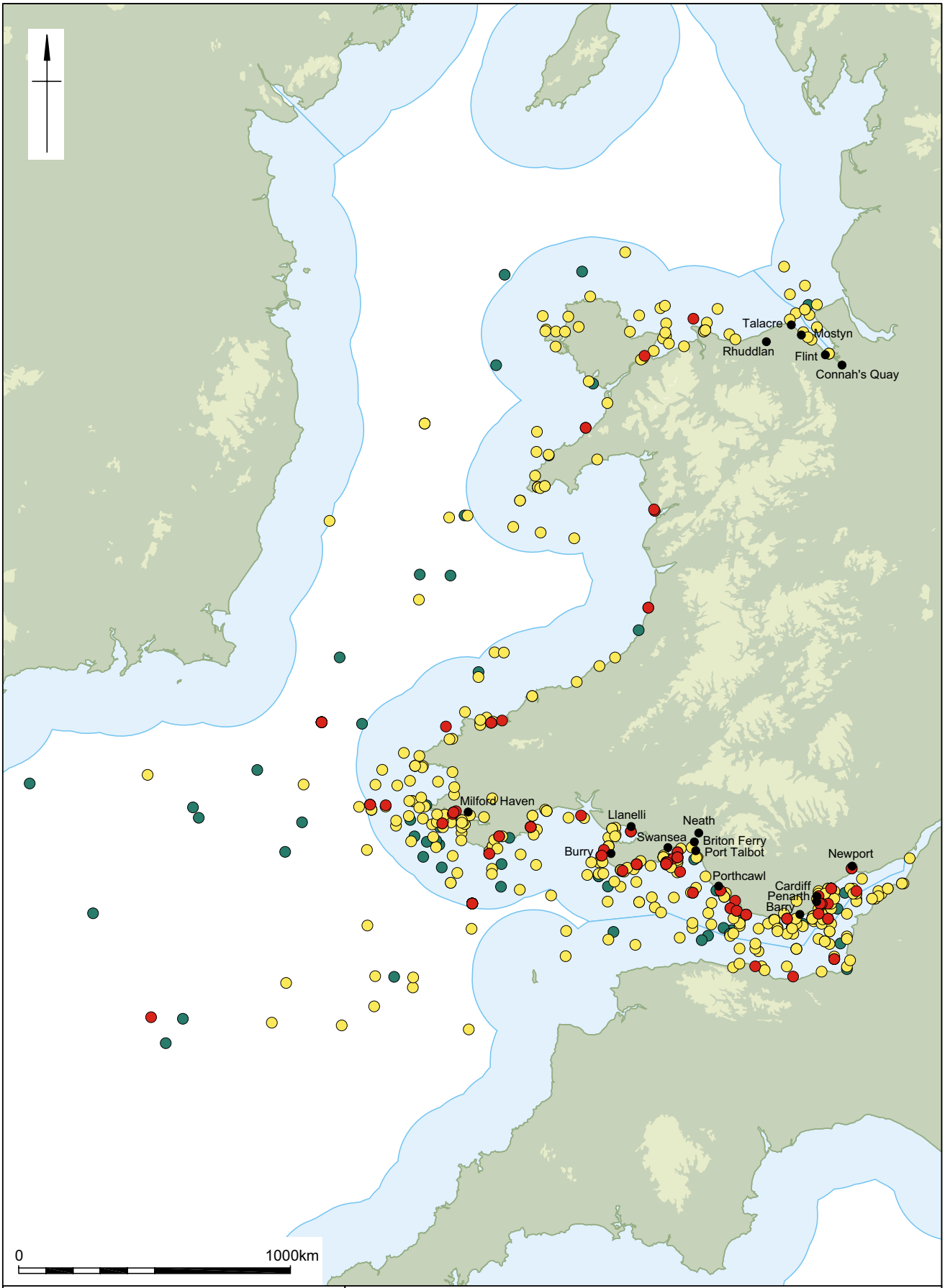
Known losses of vessels carrying coal to or from Welsh ports 1800-1945 by type of vessel

Figure 2



- Ports mentioned in the text
- 1800-1849
- 1850-1913
- 1914-1945
- Territorial waters

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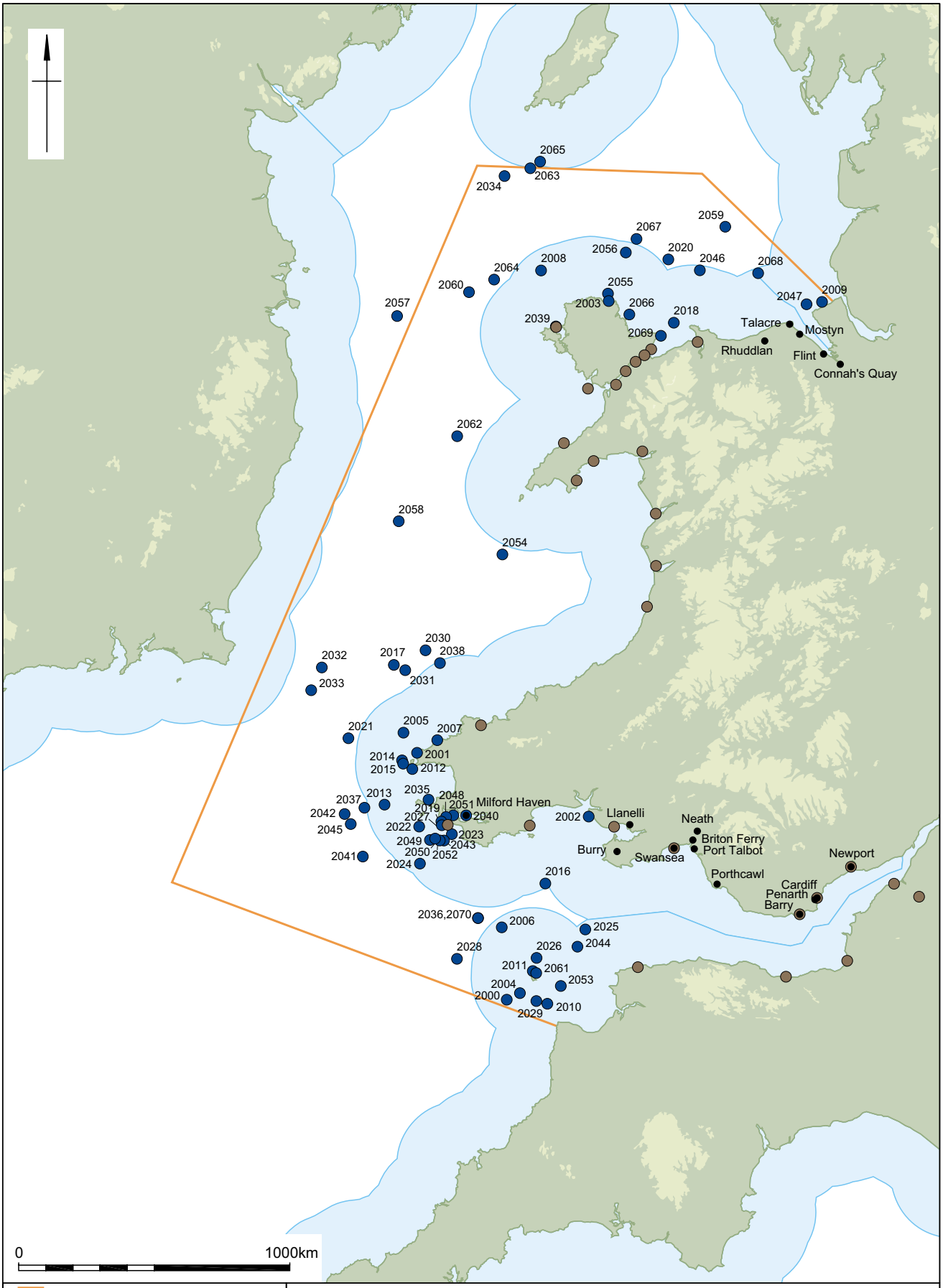
Distribution of known losses of vessels carrying coal to or from Welsh ports 1800-1945 by date

Figure 3



UKHO Study Area
Ports mentioned in the text
UKHO charted wreck
Modern port
Territorial waters

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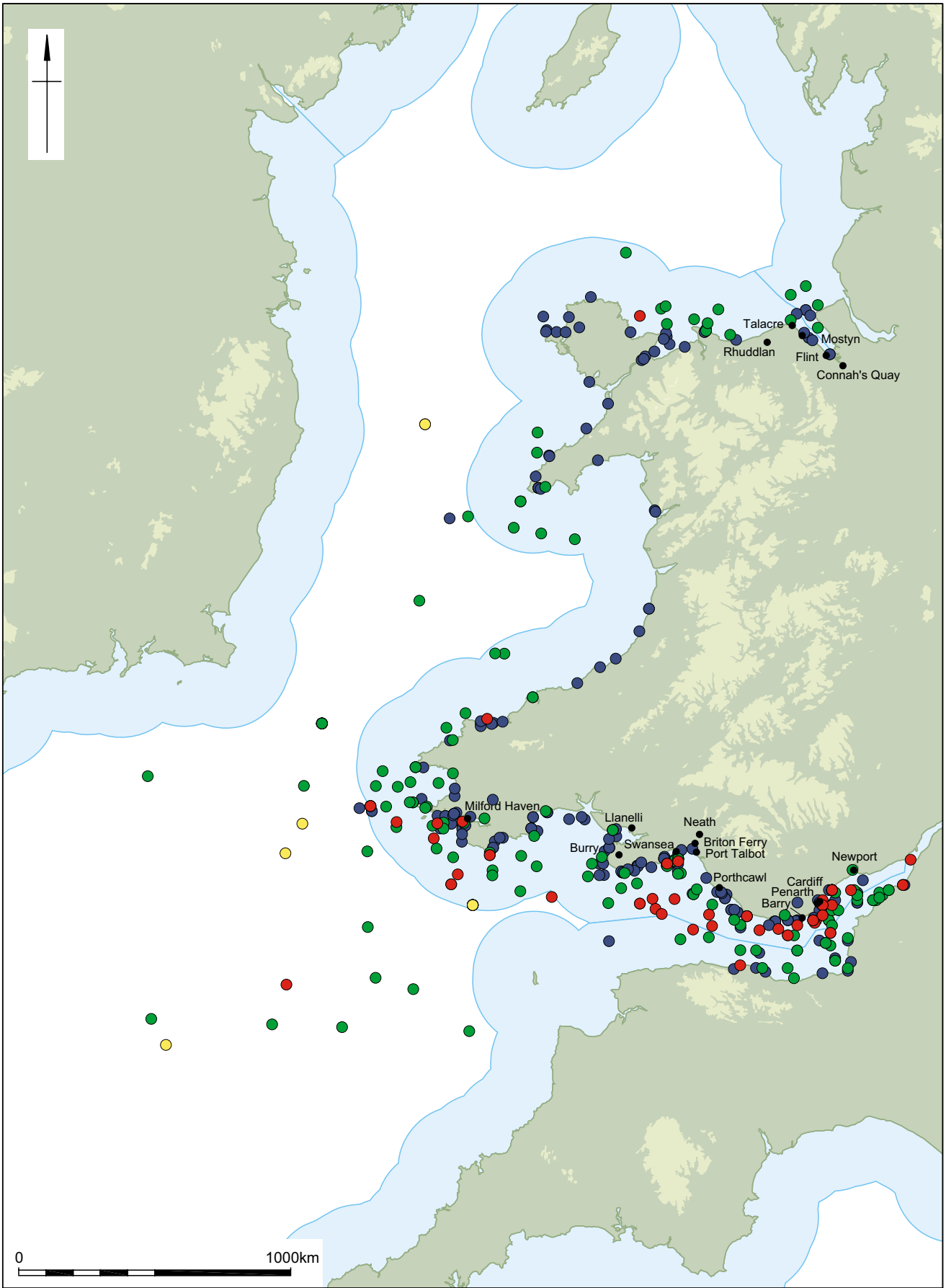
Relevant UKHO charted wrecks

Figure 4



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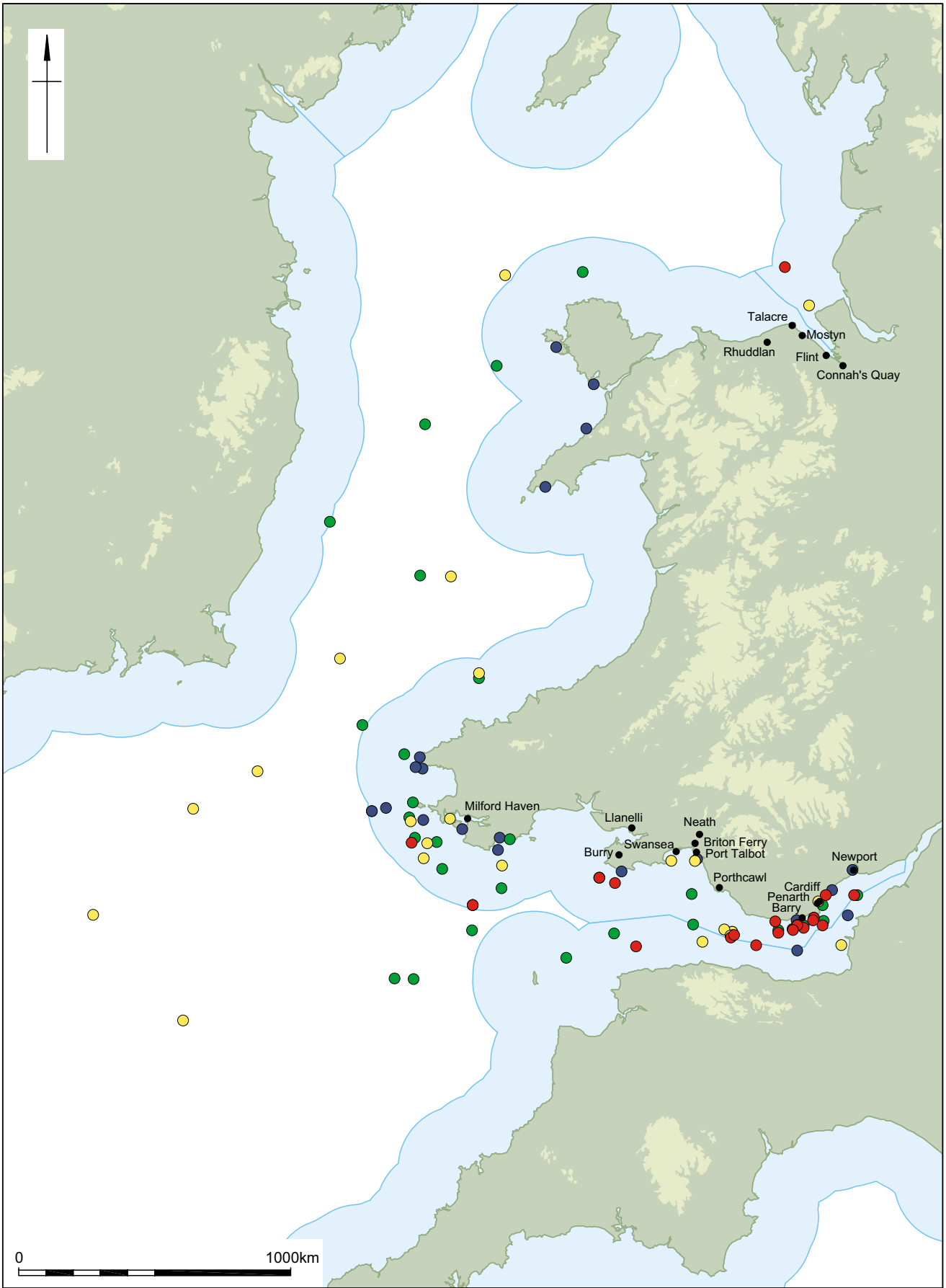
Known losses of sailing ships carrying Welsh coal by cause of loss

Figure 5



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Known losses of steamships and motor vessels carrying Welsh coal by cause of loss

Figure 6

Plate 1: Roath Dock, Cardiff, c.1910

Plate 2: Coal tips in action at No. 1 Dock, Barry, c.1910

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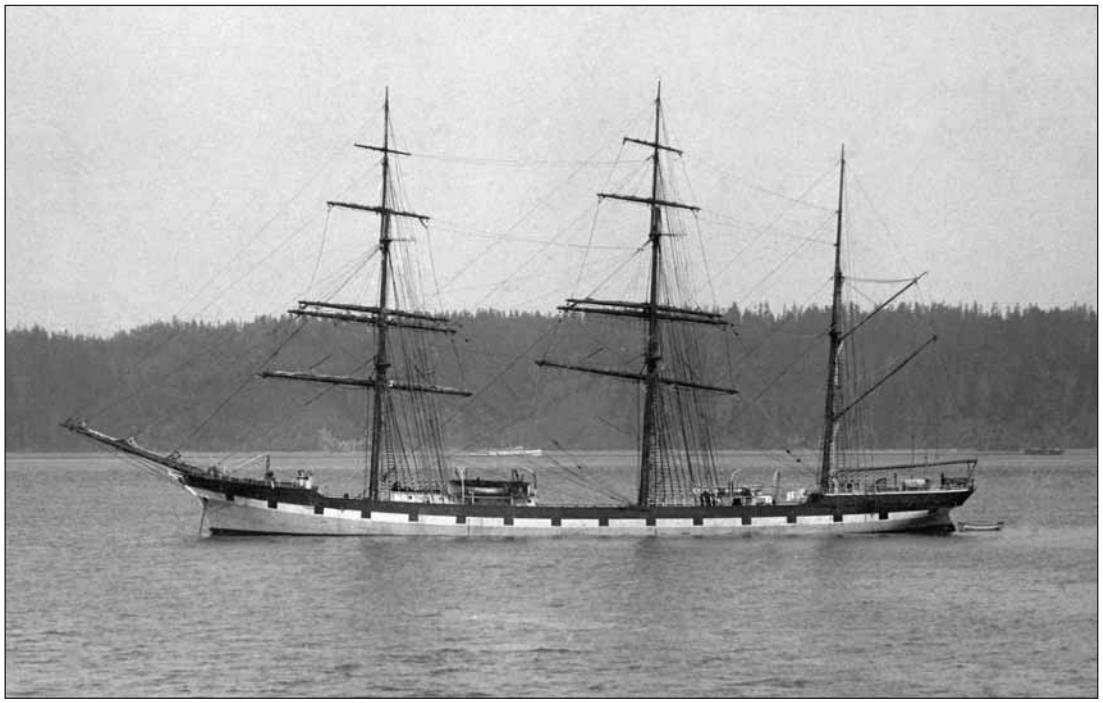

Plate 3: Steel barque *Gwydyr Castle*, built 1893

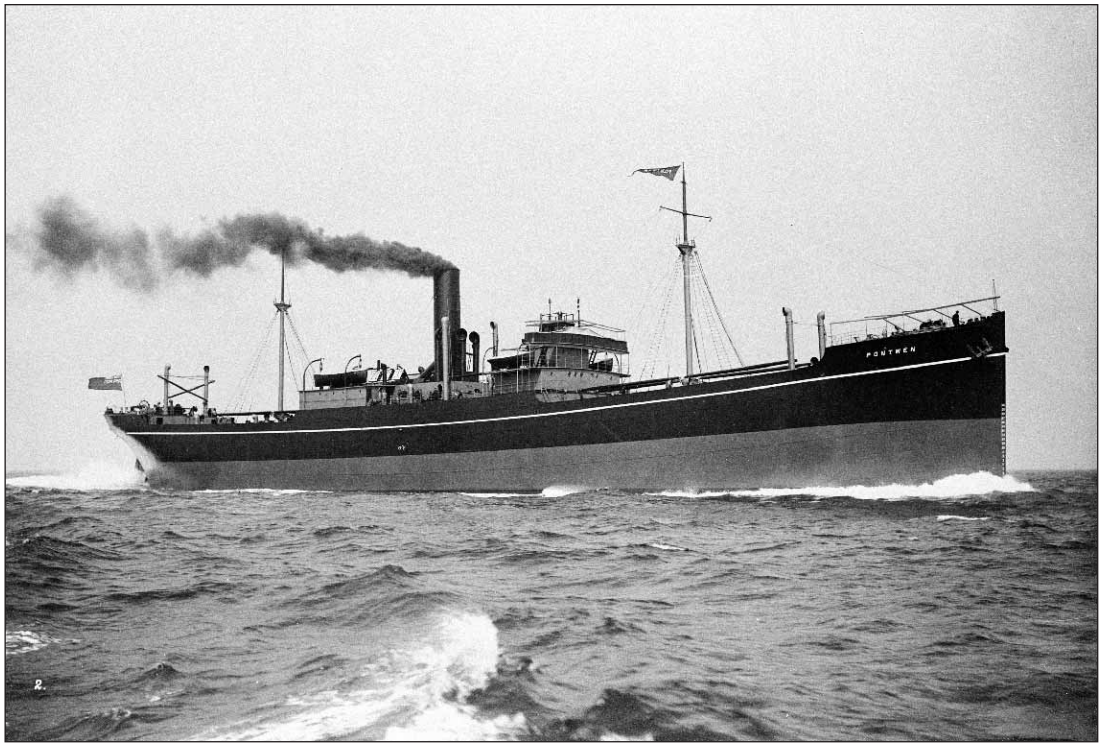

Plate 4: *SS Pontwen* on trials off West Hartlepool in the summer of 1914

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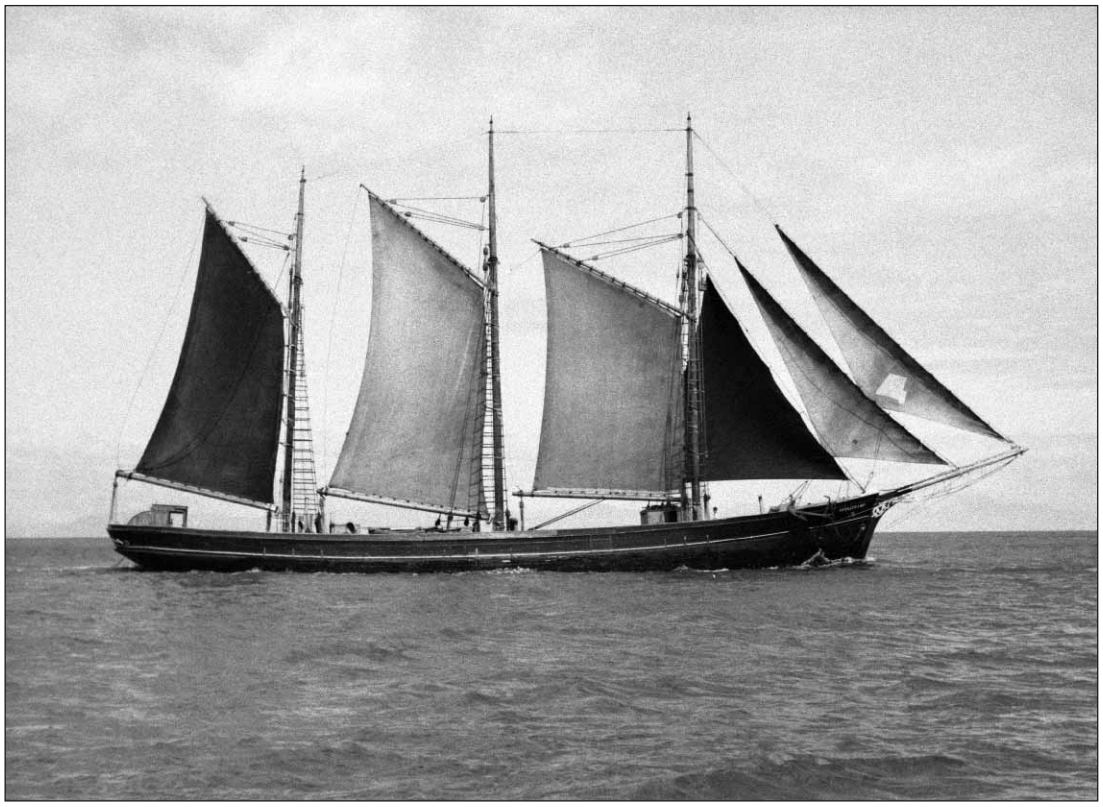

Plate 5: Wooden schooner *Kathleen & May*, built 1900

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WESSEX ARCHAEOLOGY LTD.
Head Office: Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB.
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk
London Office: Unit 113, The Chandlery, 50 Westminster Bridge Road, London SE1 7QY.
Tel: 020 7953 7494 Fax: 020 7953 7499 london-info@wessexarch.co.uk www.wessexarch.co.uk

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