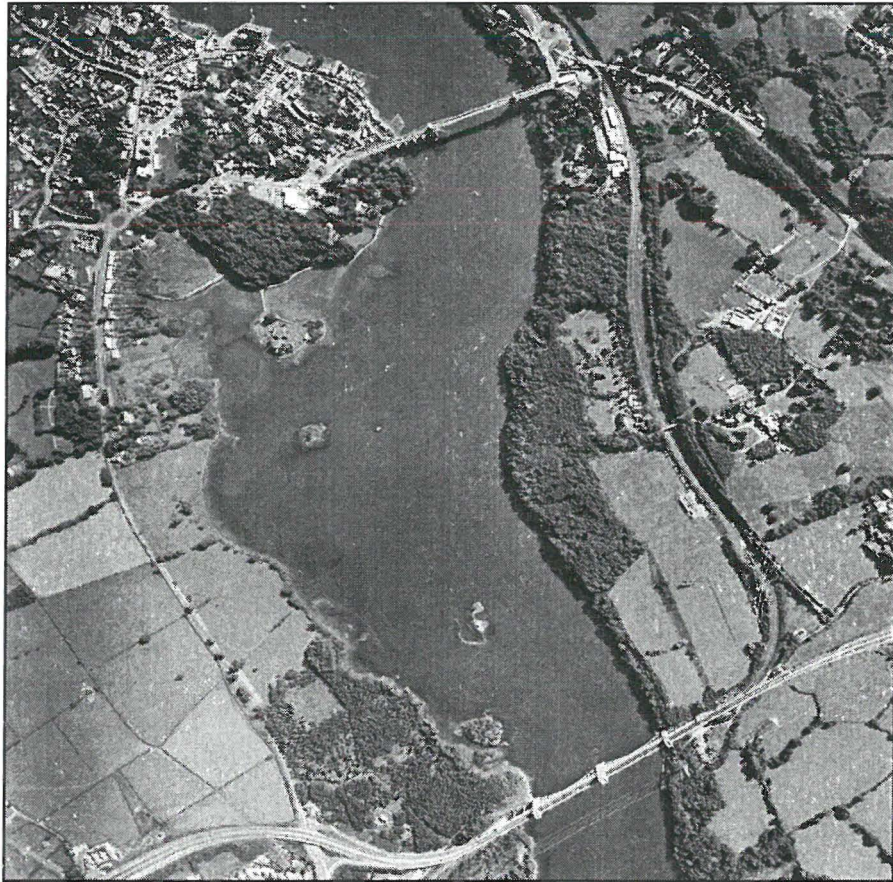


# COASTAL EROSION PROJECT

## FISH WEIR SURVEY



REPORT NO 294

GWYNEDD ARCHAEOLOGICAL TRUST  
YMDDIRIEDOLAETH ARCHAEOLEGOL GWYNEDD

Event  
PRN: 40412

COASTAL EROSION PROJECT

FISH WEIR SURVEY (G1467)

Report No. 294

Prepared for Cadw  
Welsh Historic Monuments

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Gwynedd Archaeological Trust  
Ymddiriedolaeth Archaeolegol Gwynedd

# COASTAL EROSION PROJECT: SURVEY AT GORAD DDU FISH WEIR (G1467c)

## 1 INTRODUCTION

During the Gwynedd Coastal Survey carried out by Gwynedd Archaeological Trust it was noted that the fish weir at Gorad Ddu had been damaged at one corner where a new electricity supply had been laid to Ynys Gorad Goch. This had not only severely damaged one part of the weir, but erosion was continuing either side the new cut. In addition, parts of the wall were eroding in other places, and several areas were unstable. Because of this, it was recommended that the feature be surveyed, and application was made to Cadw for grant aid. The application was successful, and this report contains the results of the survey.

Gorad Ddu is situated on the Ynys Mon shore of the central part of the Menai Straits (Fig 1). This stretch, known as The Swellies, consists of a narrow channel with numerous rocks, which cause violent tidal currents and whirlpools. The weir is an impressive structure 320m long with dry-stone walls up to 3m high. Gorad Ddu is one of the best preserved and impressive of all the fish weir structures in North Wales and was identified as being nationally important in the Anglesey Coastal Survey (GAT Report No 251).

## 2 METHODOLOGY

A desk top study and archive search of all relevant literature was carried out using records held in the Sites and Monuments Record at Gwynedd Archaeological Trust, at the University of Wales Bangor and at the County Record Offices in Caernarfon and Llangefni. Ordnance Survey maps and tithe maps were examined as well as estate maps of the area. Aerial photographs held at the Countryside Council for Wales' regional and local offices were examined although the state of the tide when they were taken was not ideal.

The Gorad Ddu fish weir was surveyed using an electronic distance measuring instrument (EDM total station). Other features that may have been associated with the weir were also recorded. The 1920 25 inch Ordnance Survey map was digitised and the resulting drawing was merged with the EDM survey to produce an accurate plan of the position and orientation of the fish weir. A photographic record was made using both colour slides and colour prints, although a full photographic survey was not undertaken.

## 3 ARCHAEOLOGICAL BACKGROUND

### 3.1 General

Fish have always been part of the human diet. The trapping of fish is one of the oldest methods of fishing known and the remains of fish weirs and traps are found throughout the country in marine, estuarine and inland waterway locations. In Wales the widespread occurrence of the word *gorad* or *gored* gives an indication of the importance of fish weirs in the rural economy. The etymology of the Welsh word *gorad* (plural *goradau*), meaning something curved, to describe a fish weir has parallels in other Celtic languages. The Irish word is '*cora*', the Gaelic '*cairidh*', the Cornish '*corras*' and the Old Breton '*coret*' (Lewes 1924, 400). In *Mona Antiqua Restaurata*, Henry Rowlands suggests that the word was derived from the Latin word *gurgites*, meaning to draw in and swallow, which was corrupted by the Britons to *gorgit* or *gored* (Rowlands 1723, 135). In confirming the possessions of two fish traps at Clynnog Fawr, Edward I refers to them as Coret Aber Saint and Coret Gwrvai (Lewes 1924, 400).

A fish weir is a simple device for catching fish. According to the classification of fishing gear by Davis they constitute Division B of Class 1: Fixed Instruments (Davis 1958, 5). A permanent guiding barrier or partial enclosure is constructed across an area or route commonly used by fish. It is positioned in

such a way that the fish are deflected into an area from which there is no escape. Various designs have been employed in rivers, estuaries and intertidal zones. Most are based on a 'V' shaped enclosure often with a small weir or gate at the apex. River weirs may face upstream or downstream to catch migrating salmon or eels. Tidal fish weirs have the open end of the 'V' facing towards the high water mark although they are often angled towards the ebb flow.

The behavioural characteristics of the fish are considered in the location and design of fish weirs. Davis notes that some species of fish move towards the shore with the flood tide and then follow the ebb tide down and along the shore (Davis 1958, 26). Basic fish weirs take account of this and have one arm at right angles to the shore with an outer arm running roughly parallel to the ebb tide and the shore. The outer arm usually ends in an in-turning hook although the outer arm of the Colwyn Bay weir inclines outwards instead of inwards (Matheson 1929, 63). The fish will come up against the arm running from the shore at ebb tide and, in heading for deeper water will be trapped behind the in-turning outer arm by the falling water levels. The walls of these weirs may be constructed of stone, stakes with wattle woven between them or a combination of the two. The fish weir also traps sediment at the seaward end that becomes colonised by marine worms which, in turn, attract feeding fish (Jones 1983).

Fish weirs in the intertidal zone are known in many areas of the British Isles. Two at Minehead in Somerset were still in operation in 1985 (Aston 1988(ii), 401). Recent studies in South Wales found a succession of fish traps dating back to the 9<sup>th</sup> century in a c. 50 ha area of the intertidal zone of the Severn Estuary (Godbold & Turner 1994). There are the remains of a large number of fish traps in Gwynedd, Conwy and Ynys Mon with a dense concentration in the Menai Straits.

Evelyn Lewes describes the extensive system of fish traps on the shore between Aberaeth and Aberayron in Cardigan Bay. He states that in the 1830's there were twelve fish traps along that stretch of shore. By 1896 this number had been halved and by 1924 only two remained in working order (Lewes 1924, 397). He also recounts the personal testimony of a retired *gorad* keeper on the hardships of such a profession. She often had to 'keep night-watches, alert with lantern and net, that she might be ready when the tide receded to secure her haul; for if she delayed a poacher might be there before her' (Lewes 1924, 399). Every spring the *gorad* keeper had to '*codi gorad*', to repair the ravages of winter storms. The *gorad* keeper also had to compete with sea birds such as herons, cormorants and gulls for the catch.

Knowledge of tidal currents was important in the location and orientation of fish weirs. At Traeth Dulas the constructors obviously had a sound understanding of current patterns as well as fish behaviour and at Ynys Gorad Goch the unique weir utilised the strength of the current. Supplementary fishing techniques were probably implemented at most weir sites to extend the effectiveness of *goradau*. These probably included ground baiting and multiple traps (Jones 1983).

### 3.2 Historical background

Prehistoric fish weirs are known, one from Ireland consisted of a row of wooden stakes and wattle. It was excavated in a riverbed at New Ferry, Lough Bog, Northern Ireland and dated to 1000 BC (Salisbury 1988, 76). The current design of eel weirs on the River Bann in Eire appears to be almost unchanged from this prehistoric example. There seems to have been little change in the design of fish weirs over the centuries so without dateable material it is very difficult to ascribe them to a particular historical period.

Saxon and Norman weirs, consisting of wooden posts with wattle panels, have been found at Colwick in Nottinghamshire (Losco-Bradley & Salisbury in Aston 1988(ii), 329-348 & Salisbury 1988). The earliest written references to fish weirs come from Anglo-Saxon Charters for Tidenham near Gloucester, which states that 'villeins had to make a hedge to capture fish', and Ombersley in Worcestershire in 706 AD (Losco-Bradley & Salisbury in Aston 1988(ii), 344 & Pannett 375). According to Lewes a 6<sup>th</sup> century fish weir *Gorad Wyddno* was mentioned in *Hanes Taliesin* as being situated between the Dyfi and Aberystwyth (Lewes 1924, 398). Sea-hedges or foreshore fish weirs were mentioned in the early 10<sup>th</sup> century laws of Hywel Dda (Bond in Aston 1988(i), 78).

Fish farming was important throughout the Medieval period with a rapid expansion during the 12<sup>th</sup> and 13<sup>th</sup> centuries due to an increase in population, greater affluence in urban centres and changes in dietary habits (Taylor in Aston 1988(ii), 466). Fifteen fish traps studied at Strangford Lough in County Down provided radiocarbon dates between the 8<sup>th</sup> and the 13<sup>th</sup> centuries and all were long abandoned by 1683 (O'Sullivan *et al* 1997). The Domesday Book suggests that fishing as an industry was already well developed by the 11<sup>th</sup> century in English rivers and estuaries with tidal fisheries on the Severn at Chepstow, Tewkesbury and Tidenham (Matheson 1929, 14).

Fish were an important part of the medieval diet especially among the nobility and in monasteries and abbeys where ecclesiastical regulations periodically forbade the eating of meat. Sea-fish were always more popular and consumed in larger quantities than fresh-water fish even at inland locations where they were often purchased as salt-fish or stock-fish (Dyer in Aston 1988(i), 30). Evidence from fish bones found during the excavation of a Medieval house at Langport in Somerset showed that, with the exception of eels, the assemblage consisted entirely of marine species (Grant in Aston 1988(ii), 412). At St Swithun's Priory in Winchester records show that fish was eaten at between 60-70% of the main meals (Bond in Aston 1988(I), 70). The ecclesiastical importance of fish is highlighted in a charter of Rhys ap Gruffydd in 1184 when the *goradau* 'on the shore and in the sea from the mouth of the Aeron to the mouth of the Arth' were offered to the monastery of Strata Florida (Lewes 1924, 398). The Cistercian Order at Tintern Abbey had numerous fish weirs on the Wye, Severn and Usk rivers from the 11<sup>th</sup> to the 14<sup>th</sup> centuries while Margam Abbey had weirs on the Afan and Neath and Neath Abbey on the Tawe, Neath and in Gower (Jenkins 1974, 6).

Most of the fish weirs discovered around the North Wales coast have produced medieval dates. A fish weir at Beaumaris known as 'Lyme Kilne Fishery' was built in 1448 with a second built beside it (Jenkins 1974). Timber from Rhos Fynach weir at Rhos on Sea was dated between 1500 and 1660 (Flook 1995). Gorad y Gyt at Bangor was referred to in 1552 and remained in use until 1852 (GAT 1997).

Most of the inland and coastal fisheries declined in the 17<sup>th</sup> century due mainly to the development of deep-sea fishing and the growing availability of other forms of cheap protein. At the end of the 16th century British fisheries had declined due to the predominance of Dutch fisheries in the North Sea (Matheson 1929, 19). The suppression of the monasteries by Henry VIII (1536-1539) dealt a severe blow to the fishing industry by the dispersal of monks and their dependants as well as the laxity in religious dietary observance among the lay population which led to different eating habits. Changes in fish behaviour may also have contributed to the decline. Fluctuations, particularly in herring populations, are recorded from AD1206, when the quantity at Aberystwyth 'was greater than had been before' and c. 1550 the herring shoals deserted their haunts near the Pembrokeshire coast but became abundant again in 1602 (Matheson 1929, 15, 21 & 24). Fluctuations in the Welsh herring fishery in the second half of the 18th century are outlined by Matheson and appear to be random with no pattern or correlation with other areas (Matheson 1929, Appendix III, 100).

### 3.3 Goradau of the Menai Straits

There is an unusual tidal pattern in the Menai Straits. The tide coming from Caernarfon Bar, to the south west, flows through the Swellies 1hr 15mins earlier than the north tide which it meets at Penrhyn Sassras near Beaumaris. The narrow rocky channel through the Swellies is sheltered from wave action and, despite being exposed to fierce currents, has allowed better preservation of the fish traps. Beach *goradau* are located in areas with a considerable tidal range of between 6m-7m, leaving a large expanse of ground left uncovered at low water (Davis 1958, 26). A tidal range of 9m is sometimes recorded in the Menai Straits.

Describing the shores of the Menai Straits in the early 18th century Rowlands observed 'long rows of big stones, lying in a line one by another, many yards below the now full sea-mark ... and in some places... another series of such stones running parallel to the lowermost row, and lying between it and the land' (Rowlands 1723, 5). He interprets these as sunken field boundaries but they were probably a succession of fish weirs. Later in the same volume he states 'the many fisheries, or those enclosures of great stones, raised in many nooks and angles in the sea around the island (Ynys Mon), especially on the shore of the River Mene (Menai Straits). And this sort of work I take the more probable to be

Roman, for that I frequently find those stone weirs in our ancient deeds to have been called 'Gurgites'.... having been first built at the command and by the direction of the Romans' (Rowlands 1723, 135).

There are at least seven *goradau* around the Swellies although some may have been interdependent and may have included *pyscodlyn*, or 'holding ponds' similar to Roman *piscina*. At Ynys Tysilio, to the east of Gorad Ddu, the walls were modified to incorporate a tidal mill. The whole area may represent an integrated system for harvesting the sea centred on Ynys Welltog between Gorad Ddu and Ynys Tysilio. The unusual tidal pattern of the Swellies led to the development of the unique current fed fish-trap of Ynys Gorad Goch consisting of a double strongly built weir in which the fish were restrained by the strength of the tide (Senogles 1969).

A fish weir at Porthaethwy was among properties conveyed by Einion and Goronwy ap Llywelyn ap Bleddyn to Madog Gloddaith in 1316. Madog's son Gruffydd paid rent for the Porthaethwy ferry in 1356 and 1357 and in 1378 he sold the fish weir to Ieuan ap Madog ab Adda but maintained an interest in the ferry (Carr 1978, 6 & Davies 1966, 42)). In 1394 the fish weir was part of property conveyed by Tudur ap Philip ap Gwrgant to Rhys ap Gruffydd ap Madog Gloddaith (Carr 1978, 6). The exact location of this weir is not stated. In 1399 Johannes Hammond sold property to Willimo ap Gryffyth ap Gwylim including a fish weir belonging to Treforion near the Menai Straits (Rowlands 1723, 135). According to Richards, Treforion was owned by the Bishop and Chapter of Bangor in medieval times (Richards 1972, 42).

The Menai Straits had a large fish population for exploitation. Records for Ynys Gorad Goch, just south of Gorad Ddu, show catches of bream, codling, dogfish, herring, garfish, gurnard, mackerel, plaice, pollack, salmon, sand eels, whitebait and whiting within the fish traps and conger eels, mullet and bass caught by rod and line (Senogles 1969, 54). The most abundant catches were members of the Clupeidae or herring family. These are a migratory species that show seasonal variations. Fish stocks appear to have changed in recent years, as, according to Jones, herring are no longer seen in the Menai Straits (Jones 1983, 34). Such fluctuations in the migratory pattern of fish stock may account for the demise of fish weirs at some locations.

### 3.4 Gorad Ddu

A grant by Queen Elizabeth to Peter Graye in 1589 refers to 'all that weir and fishery of ours within limits and circuits between flow and ebb of the sea in the township of Porthaithweye' (Davies 1966, 137). A fishery called 'le Borthan' was located at Porthaethwy and first occurred in the records in 1545 but was out of use and decaying by 1565 (Davies 1966). Senogles suggested that this fishery was contained within the area between high and low water mark and bounded by Morgan's Island by Plas Coed Mor woods in the west and Ynys Welltog to the east i.e. Gorad Ddu (Senogles 1969, 27).

In the Baron Hill estate papers Gorad Ddu was mentioned in 1607 as *piscar`y Gorad Ddy* in Trevorion and Pwllgwingyll (Richards 1974, 11).

No other records have been found with specific reference to Gorad Ddu. Jones suggests that stones from Gorad Ddu were used to construct the Belgium Promenade opposite Ynys Tysilio that was built during World War I indicating that the weir was out of use at that time (Jones 1983). Senogles hints that stones were also taken from Gorad Ddu to repair the weirs on Ynys Gorad Goch (Senogles 1969)

## 4 RESULTS OF THE SURVEY

### 4.1 Gorad Ddu fish weir – Fig 2

Gorad Ddu centred at NGR SH54657160 is located on the northern shore of The Swellies region of the Menai Straits between the Menai Suspension Bridge and Britannia Tubular Bridge (Fig 1). It is situated in a typical location with a large expanse of ground left uncovered at low water. This type of construction is probably the most sophisticated stone built fish trap used in Britain (Jones 1983, 30). Gorad Ddu is described as shown in Fig 2 from west to east.

The west wall of the weir extends at right angles to the shore for 70m before it curves to the east and terminates at the west side of the sluice. The southern, seaward, end of this wall is of similar massive construction to the main wall of the weir but becomes less substantial as it approaches the shore and in places is difficult to locate. There is a 2m breach in this western wall located 5m west of the sluice through which electricity cables were laid to Ynys Gorad Goch in 1997 (Plate 4). The wall was reinstated at the time but the standard of construction obviously could not withstand the forces of the sea at this point. The stones have tumbled mainly to the seaward side of the wall and the damage would appear to be continuing.

The angle at the west end of the weir is known as the 'cod-end' where the fish were trapped and caught (Plate 2). A well-built sluice is located in the wall at this angle that allowed the water to escape but would have restrained the fish. The sluice may have been rebuilt several times during the working life of the weir, as the stone dressing is much finer than the rest of the wall. The east side of the sluice has a 'U' shaped groove 0.2m wide by 0.3m deep (Plate 3). This could have held a device for holding back the ebb tide so that the fish were confined in a pool to the north but it was more usual for the 'cod-end' to contain a device for holding the fish. In this case the sluice would have contained a wattle or wooden lathe sluice gate, although sometimes nets or baskets were employed to hold the fish (Davis 1958, 25). Lewes states that iron grating was used in the 18th century in this context (Lewes 1924, 399). The west side of the sluice appears to have slumped and no groove was visible.

The main wall of Gorad Ddu, running for 96m parallel to the shore, is up to 3m high in places and extends a further 0.45m into the silts (Plate 1). It is 2.5m wide at the top and 3m wide at the bottom with a foundation plinth 1m wide visible along the north side of the wall for a distance of 43m. The dry-stone walls have two well-defined faces with a fill of smaller stones. The eastern end of this main wall curves to join a rocky outcrop where the wall tapers out and the outcrop itself becomes the barrier.

There are two areas of collapse on the seaward side of this main wall. One occurs 5m to the east of the sluice and extends along the wall for 7m and the other, 15m to the east of the sluice extends for 11m. Both are, at present, confined to the outer face of the wall and the collapse spreads up to 3m from the base of the wall. The inner face of the wall at these points remains intact but is obviously vulnerable to storm or current damage.

The rocky outcrop forms the barrier for the weir for 55m. The outcrop is c. 75m in diameter with a high point on the southern edge that is only inundated by very high tides. The northern side of the outcrop merges into the shoreline. There are several small stretches of walling roughly in line with the rest of the weir, on the outcrop itself. One occurs just west of the summit of the outcrop and consists of single line of large boulders set on edge between two natural small cliffs. The other also spans a gap between two natural small cliffs but is of similar dry-stone wall construction to the rest of the weir and is 2m long x 1m wide x 1m high. On the summit of this natural outcrop is a rectangular scoop that appears to have been artificially cut out of the rock. It is 3.5m long and 2.5m wide and may once have had a structure built within it.

Towards the southern side of the outcrop is a natural channel 65m long which appears to have been artificially widened and deepened, particularly at the eastern end where it forms a gully 6m wide. This is a significant feature as, without this channel, fish would not have been able to enter the pool within the main part of the weir.

The weir wall continues from the east side of the outcrop for a further 80m towards Ynys Welltog. The wall here is not as substantial as the main wall to the west of the rock outcrop but is still well built. There appears to be a definite termination at the eastern end although the wall is only 0.5m high and it could indicate an earlier breach. There are two areas of collapse on the north side of the wall close to the rock outcrop. They both extend for 10m, the first adjoining the rock outcrop and the second occurring 2m further east.

The walls of Gorad Ddu are all of dry-stone construction allowing the ebbing tide to pass through. The interstices are too small to allow fish to pass through but provide habitats for small fish and fry which are preyed upon by larger ones (Jones 1983, 30). The walls are also festooned with seaweed, which

account for it being referred to as Gorad Ddu or Black Weir. The seaweed is mainly *Ascophyllum nodosum* although *Porphyra umbilicalis* is also found on the walls and surrounding rocks which may have been harvested for 'laverbread'.

#### 4.2 Remains of possible earlier fish weirs – Fig 2

There are the remains of a wall running north south, at right angles to the shore within Gorad Ddu. This badly collapsed structure, which, in places, is represented by a spread of small stones, can be traced for 65m and terminates in the accumulation of fine silt just north of the main weir wall. It may represent the remains of an earlier fish weir constructed in the same design as Gorad y Gyt on the southern side of the Menai Straits (GAT 1997).

On the seaward side of the main wall of Gorad Ddu, close to the rocky outcrop, is another construction of large boulders as shown in Fig 2. Even at very low tides this is difficult to identify but it appears to consist of a wide wall extending 80m in a south-easterly direction from the base of the main weir. It then turns at an acute angle to the south-west and continues for a further 20m. This section shows more clearly along the inner face of the wall. The masonry at this apex appears to be 10m wide but at no time during the survey was it entirely clear of the sea to allow a close or full inspection. This structure may represent part of an earlier fish trap although it does not align with the remains of the earlier wall to the north. It is unlikely that this is the hook-end of a fish trap as it is facing the wrong way to catch fish on an ebb tide. Some fish traps were designed to operate on the flood tide but they need a non-return opening at the apex that is not apparent in this case (Davis 1958, 30). If this structure is part of an earlier fish weir it would indicate a considerable rise in sea level in the area as it would not be possible to harvest the catch on any but the very lowest tides today. Momber suggested such a rise during a study of Gorad Beuno near Caernarfon a few miles west of Gorad Ddu. He found a net sea level rise in Caernarfon Bay of about 3m in the last millennium (Momber 1991, 108).

#### 4.3 Other features surveyed – Fig 2

Several features located to the west of Gorad Ddu were also surveyed and are shown in Fig 2. These consist of a rectangular hollow 10m to the west of the weir, 4.5m long by 2m wide, oriented north-south and cut into the natural rock. A channel running down to the sea from the southern end appears to have been artificially enlarged. It could have provided sheltered mooring for a boat and may represent a boarding bay for visitors to Ynys Gorad Goch in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries when 'whitebait teas' were provided on that island for 1/- each (Senogles 1969, 49). Visitors walked down from the A5 through Coed Mor woods and rang a bell suspended in a tree on the shore to summon a boat from the island (see Fig 1).

There are two inter-connected pools 20m to the west of Gorad Ddu with a seemingly regular and artificially designed contour. These pools are oriented north-east to south-west leading down towards the sea. These may be interpreted as *pyscodlyn* or holding ponds. The most easterly, closest to the shore, is 15m x 8m and the other is 13m x 9m with a channel 7m long x 3m wide joining the two.

### 5 SUMMARY AND CONCLUSIONS

An archaeological survey was carried out at Gorad Ddu fish weir. The structure and related features were recorded and planned. Linear features within and beyond Gorad Ddu were probably earlier fish weirs and features to the west may have been connected with it.

There were formerly a large number of fish weirs around the North Wales coast and particularly within the Menai Straits (Jones 1983 & Senogles 1969). Many of these are still clearly visible as stone walls and a number still retain the remains of wattle fencing as at Gorad y Gyt (GAT 1997). In addition a number of fish traps and weirs may be preserved in the inter-tidal mud. One dated to about 1570 AD was discovered near Deganwy in 1988 (GAT 1988) and recent current changes in the Conwy estuary have allowed four fish weirs to be visible again at low tide on Llandudno's West Shore (Phillips 1996). Recording during coastal protection work at the Rhos Fynach weir at Rhos on Sea led to the discovery of timbers dated between 1500 and 1660 (Flook 1995).



Much research work still needs to be done on the economic importance of fisheries during different historical periods and on the development of fish traps. There is a need to assess, record and catalogue the existing remains in order to compile a comprehensive list of fish traps around the North Wales coastline. Without this resource it is difficult to assess the importance of Gorad Ddu in Regional and National terms. The regular references to fish weirs in Medieval and later documents suggests they played an important role in the local economy from at least the 12<sup>th</sup> century through to the 19<sup>th</sup> century and the quantity of physical remains still visible around the coast would confirm this importance.

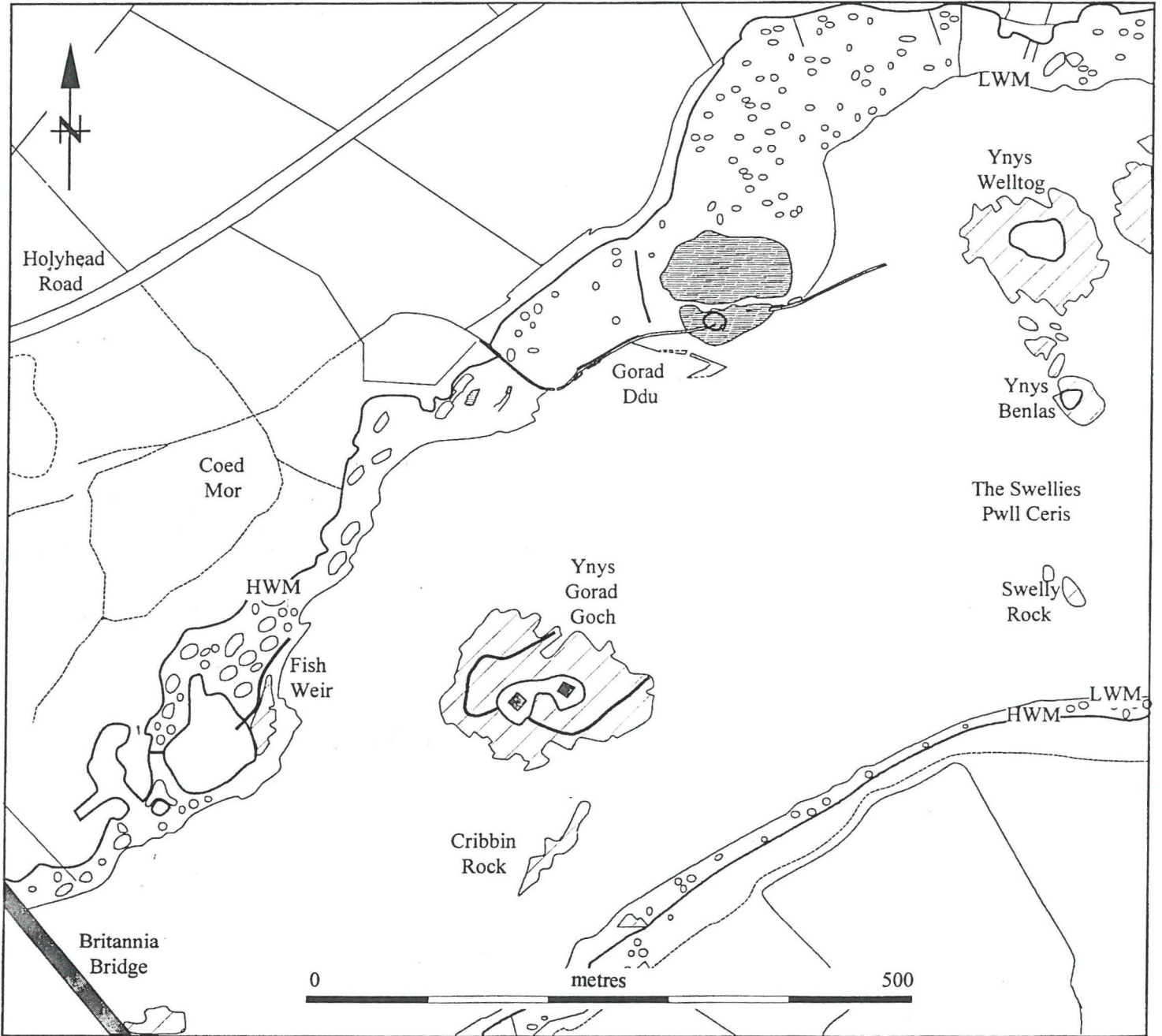
Although still well preserved Gorad Ddu is vulnerable to the ravages of storm and tide and where breaches and collapses have already occurred it is in danger of further erosion, particularly on the western wall to the west of the sluice. Further work needs to be done on the features within and to the south of Gorad Ddu to ascertain their nature and function. This may require the assistance of marine archaeologists to record the underwater extent of the structure to the south of the main wall. This structure would seem to confirm the sea level rise of 3m in the last thousand years suggested by Momber (Momber 1991, 109).

## 6 BIBLIOGRAPHY

- Aston M (ed) 1988(i) *Medieval Fish, Fisheries and Fishponds in England* BAR British Series 182(i)
- Aston M (ed) 1988(ii) *Medieval Fish, Fisheries and Fishponds in England* BAR British Series 182(ii)
- Bond C J 1988 *Monastic Fisheries* in Aston (ed) 1988(i) pp 69-112
- Carr A D 1978 *Medieval Fisheries in Anglesey* *Cymru a'r Mor Maritime Wales* Number 3 pp 5-8
- Davies H R 1966 *The Conway and the Menai Ferries* University of Wales Press Board
- Davis F M 1958 *An Account of the Fishing Gear of England and Wales* MAFF Fishery Investigations Series II Vol XXI Number 8 HMSO pp 1-40
- Dyer C C 1988 *The Consumption of Fresh-water Fish in Medieval England* in Aston (ed) 1988(i) pp 27-38
- Flook R 1995 *Rhos on Sea Coastal Protection Works* GAT Report No 152
- Glazebrook H 1970 *Anglesey and North Wales Coast Pilot* Yachting Monthly Publication
- Godbold S & Turner R C 1994 *Medieval Fishtraps in the Severn Estuary* *Medieval Archaeology* Vol XXXVIII pp 19-54
- Grant E 1988 *Marine and River Fishing in Medieval Somerset; Fishbone Evidence from Langport* in Aston 1988(ii) pp 409-416
- Gwynedd Archaeological Trust 1988 *Discoveries in the Conwy Estuary* GAT SMR PRN 4392
- Gwynedd Archaeological Trust 1997 *Coastal Erosion Survey: Anglesey* GAT Report No. 251
- Gwynedd Archaeological Trust 1997 *Gorad y Gyt fish weir and oyster beds* GAT Report No 254
- Jenkins J G 1974a *Nets and Coracles* David & Charles Newton Abbot
- Jenkins J G 1974b *Fish Weirs and Traps* *Folk Life* Vol 12 pp 5-9

- Jones C 1983 Walls in the sea – the goradau of Menai : Some marine antiquities of the Menai Straits  
*The International Journal of Nautical Archaeology and Underwater Exploration* Vol 12.1 pp 27-40
- Lewes E 1924 The Goredi near Llanddewi Aberarth, Cardiganshire *Archaeologia Cambrensis* Vol LXXIX Part II pp 397-400
- Losco-Bradley P M & Salisbury C 1988 *A Saxon and a Norman fish weir at Colwick, Nottinghamshire* in Aston 1988(ii) pp 329-352
- Matheson C 1929 *Wales and the Sea Fisheries* National Museum of Wales
- Momber G 1991 Gorad Beuno : investigation of an ancient fish-trap in Caernarfon Bay, N. Wales  
*The International Journal of Nautical Archaeology* Vol 20.2 pp 95-109
- O’Sullivan A McErlean T McConkey R & McCooley P 1997 Medieval fishtraps in Strangford Lough, Co. Down *Archaeology Ireland*
- Pannett D J 1988 Fish Weirs of the River Severn *Folk Life* Vol 26 pp 54-64
- Pannett D J 1988 *Fish Weirs of the River Severn with particular reference to Shropshire* in Aston 1988(ii) pp 371-390
- Phillips J 1996 Out of the Depths *North Wales Weekly News* 26th September 1996
- Richards M (ed) 1972 *An Atlas of Anglesey* Anglesey Community Council
- Richards M 1974 Some Fishing Terms in Welsh Place-Names *Folk Life* Vol 12 pp 9-19
- Rowlands H 1723 *Mona Antiqua Restaurata* Redesmere Press Ltd (1993 edition)
- Salisbury C R 1988 *Primitive British fishweirs* in Good G L *et al* (eds) *Waterfront archaeology* CBA Research report No 74 pp 76-87
- Senogles D 1969 *The Story of Ynys Gorad Goch in the Menai Straits* Private Publication
- Stean J M & Foreman M 1988 *The archaeology of medieval fishing tackle* in Good G L *et al* (eds) *Waterfront archaeology* CBA Research report No 74 pp 88-101
- Taylor C C 1988 *Problems and Possibilities* in Aston 1988(ii) pp 465-474

Fig 1 : Location of Gorad Ddu and other fish weirs in the Swellies area of the Menai Straits  
compiled from O/S 1:10560 1920 Anglesey - Sheet XIX SE and EDM survey



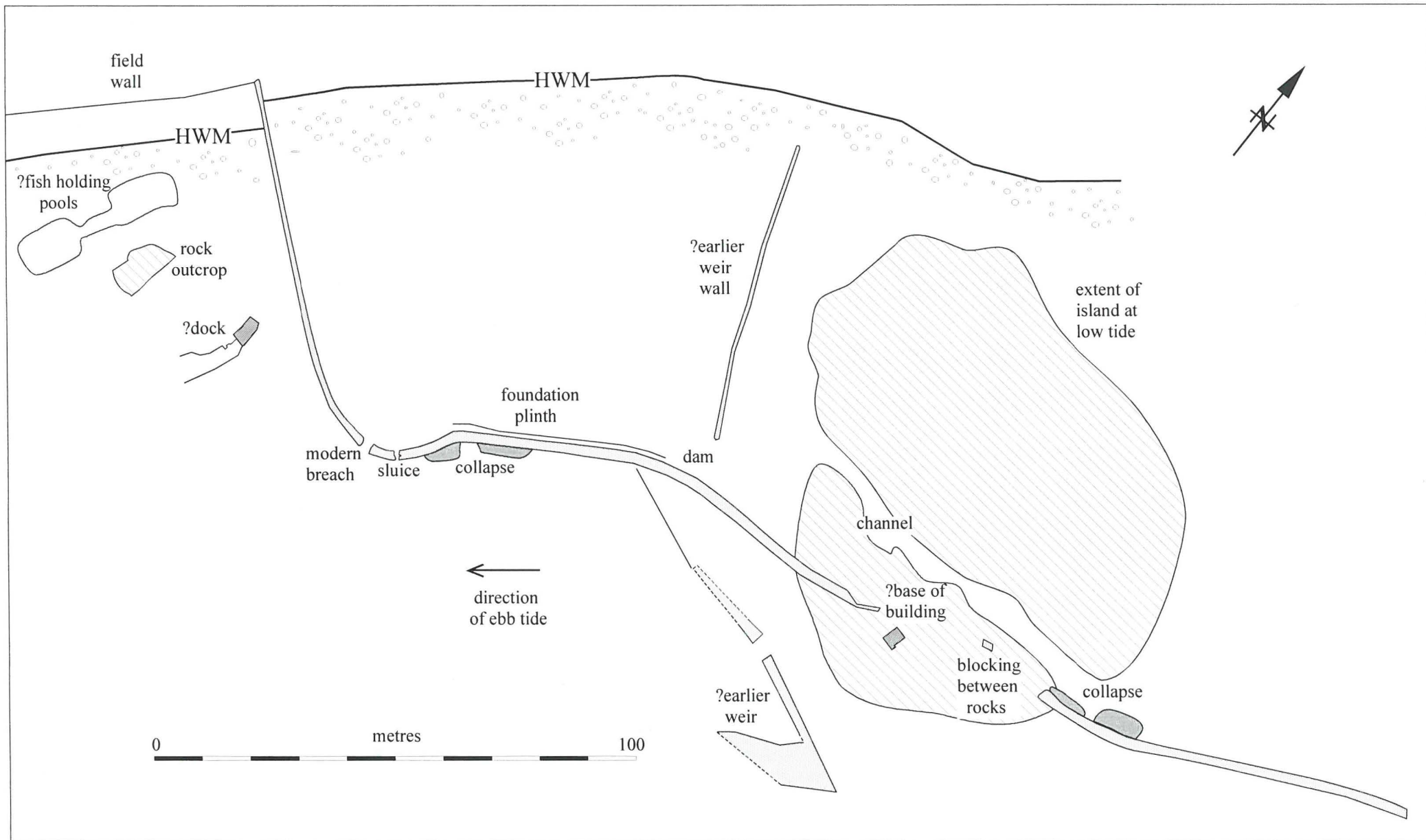


Fig 2 : Plan of Gorad Ddu fish weir and associated features from EDM survey



Plate 1: Gorad Ddu - main wall from W



Plate 2: Gorad Ddu - western end of main wall with sluice on the right from NW



Plate 3: Gorad Ddu - east side of sluice from N



Plate 4: Gorad Ddu - Breach in western wall from NE

