CADW Rivers and Riparian Environments: Camarthenshire

Weir PRN 24453 downstream of Llandeilo Bridge.

Prepared by
Dyfed Archaeological Trust
For: Cadw

DYFED ARCHAEOLOGICAL TRUST

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CADW Rivers and Riparian Environments: Carmarthenshire

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Rivers and Riparian Environments: Carmarthenshire

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RIVERS AND RIPARIAN ENVIRONMENTS:

CARMARTHENSHIRE

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RIVERS AND RIPARIAN ENVIRONMENTS:

CARMARTHENSHIRE

CRYNODEB

Mae'r priosect yn cael ei ariennir gan Cadw, ac yn cysylltu a Phrosiect Cwmpasu Addasu I Newid yn yr Hinsawdd YAD , sy'n anelu i nodi dyffynnoedd sydd ar berygl uchel, anolig neu isel sy'n dibynnu ar gwahanol ffactorau. Y prif perygl o newid yn yr hinsawdd yw llifogydd difrifol ac amlach a fydd yn cynyddu cyfradd yr erydu a diraddio naturiol presenol. Yn y tymor byrrach, mae rhaglen Cyfoedd Naturiol Cymru (CNC) ac Ymddiriedolaeth Afonydd Gorllewin Cymru (YAGC) o gael gwared ar goredau sy'n fydythu nifer o goreday hanesyddol yn ogystal a rhaglenni adnewyddu a chynnal a chadw pontydd awdurdodau lleol.

Ar hyn o bryd bydd CNC yn ymgynhori ag ymddiriedolaethau archeolegol Cymru os cofnodir cored ney debyg ar HER: ychydig iawn o strwythurau o'r fath sy'n cael eu cofnodi ar yr HER ac felly maen't yn cael eu ystyriaeth i'w pwysigrwydd hanesyddol / archaeolegol a heb unrhyw gofnod yn cael ei greu.

Mae'r priosect 6 mis yma yn dilyn ymlaen o ardaloedd o'r astudiaeth beilot Gwendraeth Fach yn Ne-ddwyrain Sir Gaerfyrddin a Chleddau Ddu yng Nghanol Sir Benfro a gynhaliwyd yn 2020-21.

Seiliwyd y fethodoleg ar y priosect peilot. Roedd hun yn brosiect desg a oedd yn canolbwyntio ar gofnodi nodweddion yr afon yn gyflym gan ddefnyddio mapiau GIS Arolwg Ordnans hanesyddol ochr yn ochr ag Map Arolwg Ordnace fodern a awyrluniau. Dros y 6 mis cafodd nodweddion afon amrywiol eu nodi, eu nodweddion ei ychwanegu i'r HER. Cafodd 1114 o cyfnodion dwyiaithog newydd ei greu. Ar ol cwblhau'r prosiect bydd y cofnodion HER dwyieithog yn cael ei ddefnyddio ar gyfer priosiectau YAD yn y dyfodol.

Yn yr adroddiad yma bydd y dull a ddefnyddiwyd gyda chrynodeb byr o'r canlyniadau ac argymhellion ar gyfer gwaith pellach yn cael eu nodi.

SUMMARY

This project is funded by Cadw and links in with DAT's Climate Change Adaption Scoping Project, which aims to identify valleys at high, medium or low risk depending on a range of factors. The main risk of climate change being more severe and more frequent flooding events that will increase the rate of existing natural erosion and degredation. In the shorter term NRW's and West Wales Rivers Trust (WWRT) programme of weir removal is a threat to numerous historic weirs, as are local authority programmes of bridge replacement and maintenance.

Currently NRW will consult with the Welsh archaeological trusts if a weir or similar is recorded on HERs: very few such structures are recorded on HERs and thus they are being removed with little thought to their historical/archaeological importance and with no record being created.

This 6 month project follows on from the pilot study areas of Gwendraeth Fach in Southeast Camarthenshire and Eastern Cleddau in Central Pembrokeshire undertaken in 2020-21.

The methodology was based on the pilot project. This was a desk-based project that focused on rapid recording of the river features using historic and modern Ordnance Survey GIS mapping alongside aerial photography. Over the 6 months various river features were identified, characterised and added to the HER system with 1114 bilingual

records made. On completion of the pilot project the bilingual HER records made will enhance the HER and be used to inform future DAT projects and site management.

Within this report the approach taken with a brief summary of results and recommendations for further work will be stated.

1. INTRODUCTION

This aim of this project was to identify man-made river features across Carmarthenshire. This six month project was funded by Cadw and undertaken by Dyfed Archaeological Trust.

The project involved rapid recording on the DAT Historic Environment Record (HER) of river features in the catchment areas of the River Towy and River Cothi and their tributaries in Carmarthenshire. A bilingual HER record was made for each feature whilst polygons were created for mill races and mill ponds. This was a HER and GIS (MapInfo) based project. Within the HER information classification and condition is presented. The data from MapInfo and HER are referenced together by DAT PRN.

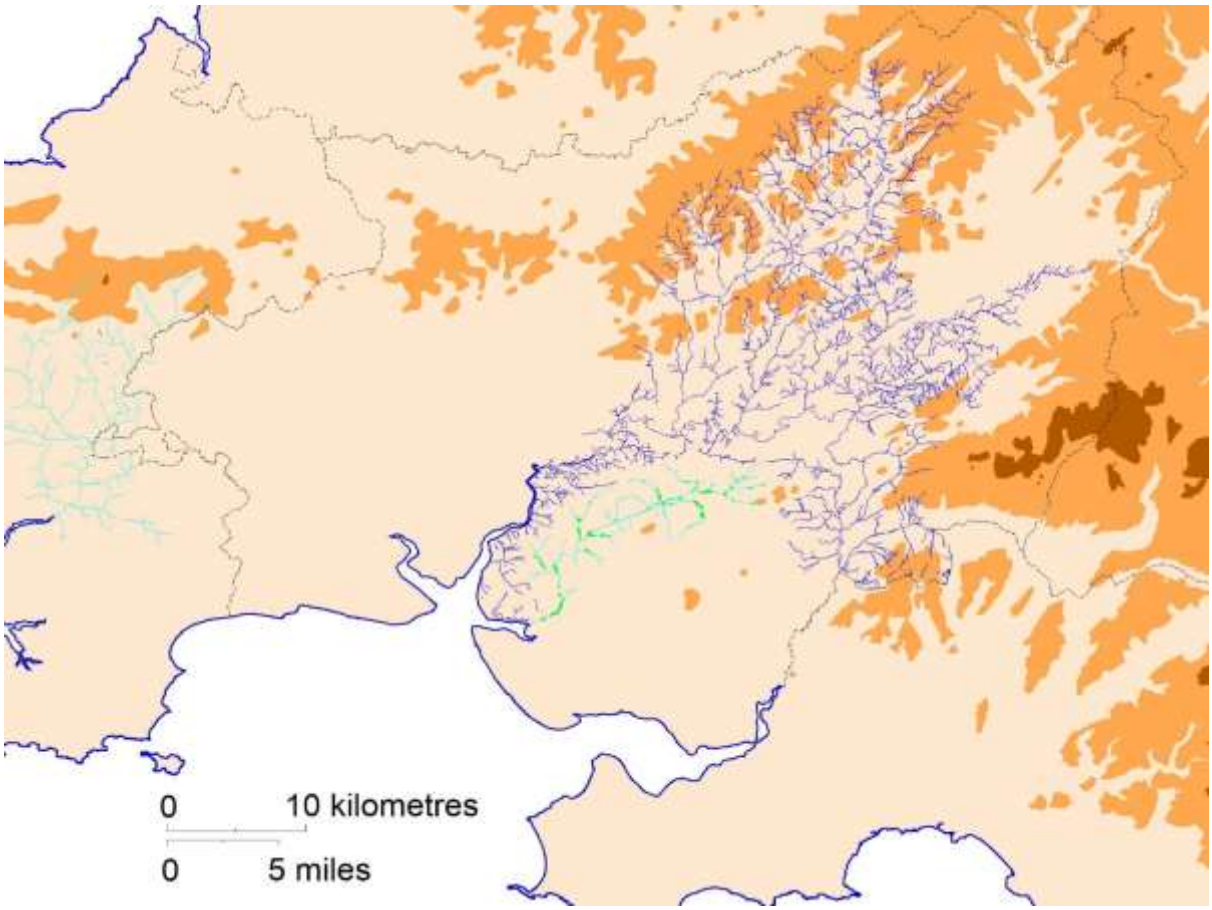

Figure 1: Rivers shown in blue assessed in the 2021-22 project, rivers in green assessed during the 2021 pilot project.

2. METHODOLOGY

The methodology which was undertaken for this project was based on and refined during the pilot project undertaken by Dyfed Archaeological Trust in the areas of Gwendraeth Fach in southeast Camarthenshire and Eastern Cleddau in central Pembrokeshire.

Within the six months this project was undertaken it focused on the Carmarthen area and started with the River Towy and its tribrutaries. The other Dyfed region (east of the River Towy in Carmarthenshire, the whole of Pembrokshire and Ceredigion) have not been examined in this phase of the project.

Examination of the features took place using the 1st and 2nd Edition 1:2500 Ordnance Survey maps which were also used as base maps. These maps were chosen as they provided consistent coverage over the area of study and river features were marked and frequently labelled. Along side the base maps, modern mapping was used to follow the water courses as they were of limited use to identifying historic environment assests. Vertical aerial photograpy was used to determine if the feature stil existed. However the aerial photography was a poor data source which presented issues as almost all instream features were under tree lines and obstructed from view.

Existing HER records for instream features were checked to see if accompanying features had been included within the summary. Features were inditified if they had been labelled on the historic maps.

(See Appendix 1)

3. RESULTS

A total of 1114 biligual HER records were made over the course of 6 months. Numerous features were identified with a breakdown of the characteristics shown in Table 1. This gives an indication of the vast amount of features that can possibly be identified within in a catchment area.

Feature Along River Course	Number of Feature / % Recorded
Footbridge	445 / 39.9%
Ford	302 / 27.1%
Well	157 / 14.1%
Bridge	10 / 0.9%
Sluice	89 / 8.0%
Mill Race	15 / 1.3%
Mill Pond	3 / 0.3%
Mill	3 / 0.3%
Saw Mill	1 / 0.1%
Weir	49 / 4.4%
Reservoir	4 / 0.3%
Stepping Stones	5 / 0.4%
Sheepfold	18 / 1.6%
Sheep Wash	2 / 0.2%
Wheel Pit	1 / 0.1%
Saw Pit	5 / 0.4%
Aqueduct	3 / 0.3%
Breakwaters	1 / 0.1%
Water Wheel	1 / 0.1%

Table 1. Number and % of each primary Site Type identified

Due to the lack of vertical aerial view photography the 'Condition' of all features noted on the HER as 'Not Known' as without a site visit it was impossible to know the true condition of the sites due to the features being obstructed by tree lines while using vertical aerial photography.

With the exception of the odd sheepfold, footbridge and ford, the upper catchement areas had less historical features as compared with the lower land of the valleys with the denser population and active industries.

A rare feature within the Carmarthenshire area are stepping stones with only five sites identified during the six months. Normally stepping stones were identified within the higher land of the valley with little population on the 1st Edition Ordnance Survey maps, which then progressed to footbridges on the 2nd Edition Ordnance Survey Map or remain the same. However an unusual site (PRN's 127051, 127052, 127053) within the Llanfynydd community, labelled on the 1st Edition Ordnance Survey Map within the heart of a populated area is a footbridge and ford (PRN's 127052, 127053) which then progresses to stepping stones labelled on the 2nd Edition Ordance Survey Map. A progression that seemingly is contradictory to other similar sites (Figures 2 & 3). Without a site visit it is impossible to know whether either of the features still exist.

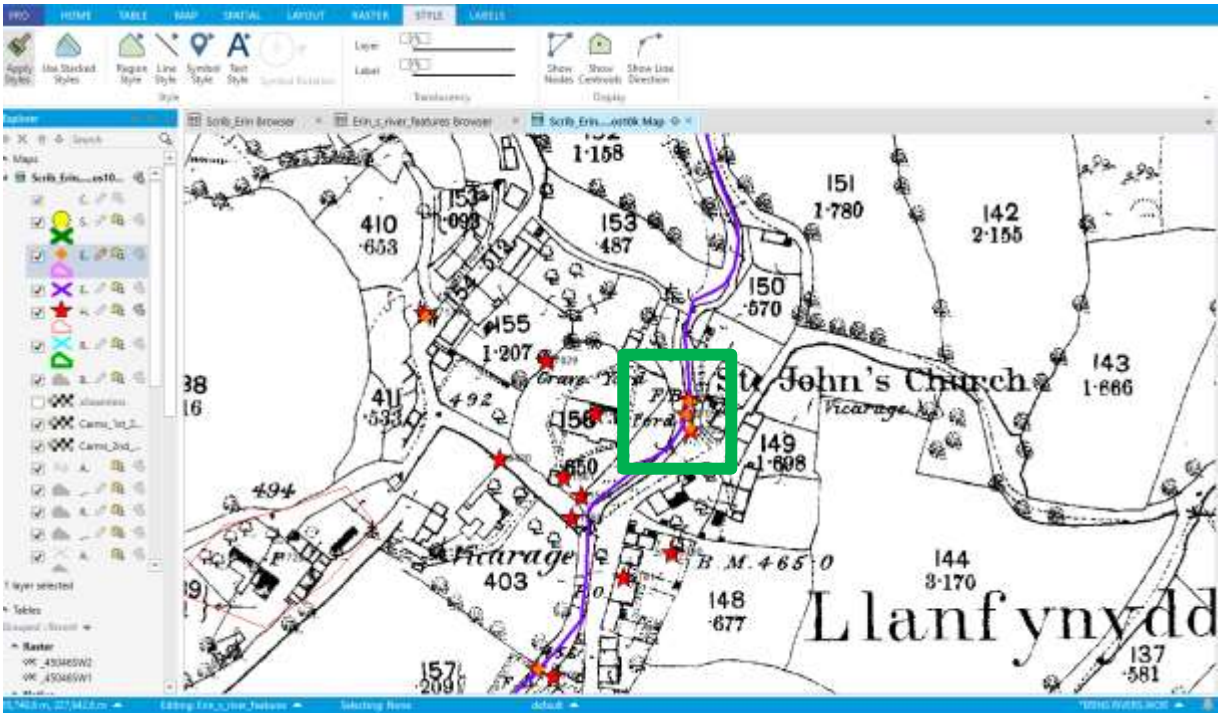

Figure 2: The footbridge and ford labelled in Llanfynydd on 1st Edition 1:2500 Ordnance Survey Map.

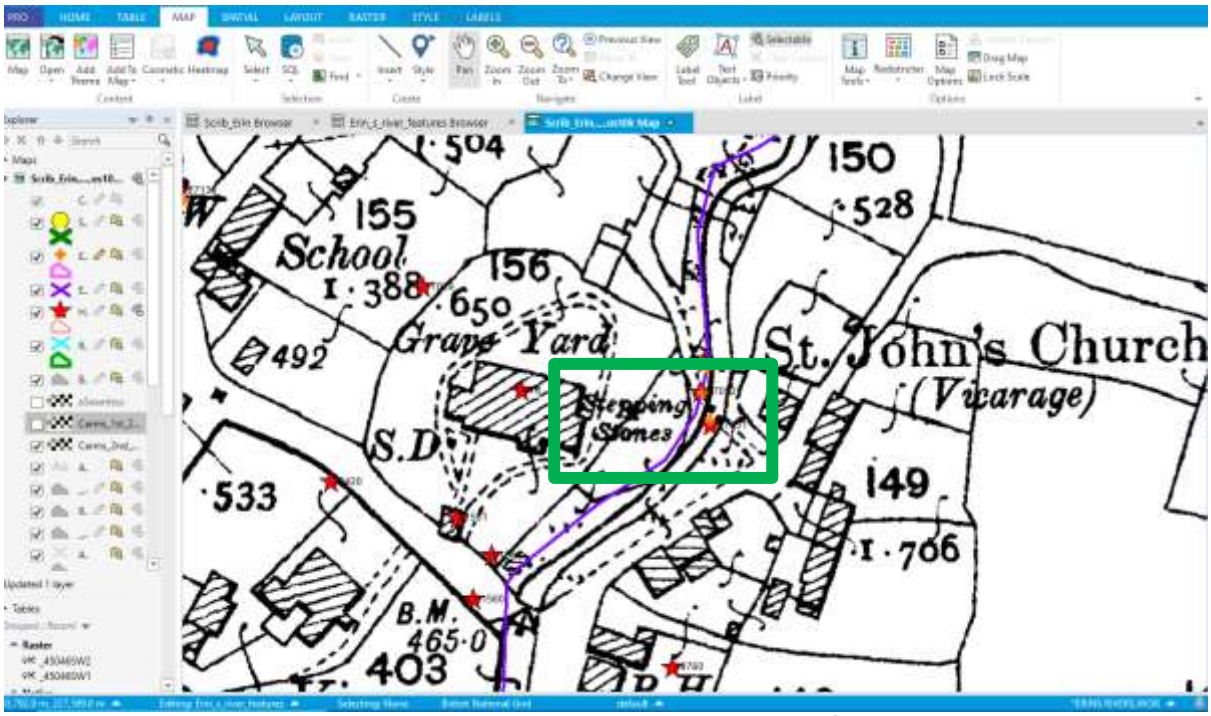

Figure 3: The stepping stones labelled in Llanfynydd on 2nd Edition 1:2500 Ordance Survey Map.

4 PROBLEMS ENCOUNTERED AND RECOMENDATIONS FOR FUTURE WORK

Although taking a rapid approach to identification and creation of bilingual HER records, the six-month time frame did not lend itself to completing the whole of Carmarthenshire. For completion of Carmarthenshire at least another six months is needed, and if the whole of Dyfed's regions are to be completed a larger time scale again is needed.

Features became increasingly challenging to identify in areas of the rivers and streams where they had been straightened after the dates of the historic 1:2500 Ordnance Survey Maps. This is because the water courses on the historic maps and modern day maps no longer matched up. Whilst following the modern day water course, some time was spent mapping the discrepancies of the older watercourse to identify features and cross-referencing the modern and historic water courses.

Leats, dams and culvets were difficult to identify without a site visit as they were not labelled on either historic map. Even with vertical aerial photography, identification of the sites and features were difficult or mostly impossible to see as they were hidden under treelines. To add to the trouble of seeing sites the photographs had been taken during the spring and summer seasons when the trees were flushed with leaves obstructing almost all sites from view.

Another issue encountered was the difficulty in determining if a feature labelled 'well' was in fact a natural 'spring' or a man-made well. To overcome this 'Well' labels were only added to the HER system if they were labelled as such on both historic maps and were near to or within the vicinity of buildings, dwellings or towns.

Recommendations for future work regarding this project would be to complete all Dyfed regions. Site visits of particularly interesting sites would be helpful to determine if a feature still exists, and if so its condition status to enhance the information on the HER records. If particularly interesting sites are discovered to have remaining features and are of historical importance, having the site considered for a listing status may be considered.

5 CONCLUSIONS

Overall, the methodology used for this project is very effective to rapidly capture large amounts of data and record efficiently, as demonstrated by the total number to date 1114 records. The layering of historic Ordnace Survey Maps above the modern Ordance survey map worked well although some challenges occurred when the watercourse had moved. This was resolved by following both the historic and modern watercourses separately and cross-referencing the identified features. This methodology would continue to work well in the future if other regions of Dyfed are to be completed. Site visits would be useful in developing the information further on site for the HER system.

The information collected can be used by DAT to make informed decisions and to advise NRW when asked regarding their river projects and restorations. This information can also be passed on to local authorities regarding bridge restoration with the advice of a DAT planning archaeologist.

6 ACKNOWLEDGMENTS

The digistisation, analysis and reporting was undertaken by Erin Lloyd.

7 SOURCES

Ordnance Survey: 1888 : 1st Edition, 1 : 2500 Carmarthenshire

Ordnance Survey: 1907 : 2nd Edition, 1 : 2500 Carmarthenshire

Ordnance Survey : 2013 : Mastermap, 1 : 2500

8. APPENDIX

1. Rivers and Riparian Environments – pilot project

DAT's Climate Change Adaption Scoping Project identified valleys at high, medium or low risk depending on a range of factors, the main risk coming from more severe and more frequent flooding events that will accelerate the rate of continuing natural erosion and degradation. In the shorter term NRW's and West Wales Rivers Trust (WWRT) programme of weir removal is a threat to numerous historic weirs, as are local authority programmes of bridge replacement and maintenance.

Currently, NRW will consult with the Welsh archaeological trusts if a weir or similar is recorded on HERs: very few such structures are recorded on HERs and thus they are being removed with little thought to their historical/archaeological importance and with no record being made of them.

Types of Historic Environment Asset

The following are the types of historic environment asset that could potentially be included in the HER.

Bridge: The more important bridges are named on historic and modern maps. Listed bridges are recorded on the HER, very few unlisted ones are. Assessing condition of historic bridges is problematic as many have been replaced by modern structures.

Culvert/minor bridge: A common historic environment asset, but it is impossible to assess from documents and maps whether a feature is a simple pipe beneath a road and should not be included in the HER or is a small, stone bridge and should be included in the HER.

Dam: A surprisingly rare historic environment asset, but normally of some historical significance.

Ford: A common historic environment asset, but it is impossible to assess from documents and maps whether a ford is a simple crossing with no built elements or if it contains walls, weirs and other features.

Footbridge: A common historic environment asset, but it is impossible to assess from documents and maps whether a footbridge is a temporary structure or more permanent with substantial built elements. Normally footbridges over natural watercourses are included in the HER; those over leats were probably no more than wooden planks and so not included in the HER.

Leat: Normally they were constructed to deliver water to a mill or other industrial facility but could be ornamental or serve other purposes. They are usually marked on historic Ordnance Survey maps.

Sluice: These are minor features and can normally be incorporated into the record for a leat, weir or mill.

Weir: These were constructed to raise the water levels in a river or stream. They are often found immediately downstream of the head of a leat. Larger weirs are usually labelled on maps; minor ones may be depicted by a line across a river/stream. Weir sites can be of some antiquity. In the medieval period they were often referred to as fisheries.

Other types of site: stepping-stones, fish farms/fish hatcheries, waterworks.

Sources of information

Historic Ordnance Survey Maps: Digitised OS 1:2500 1st and 2nd Edition maps are the most useful sources of information. Assets such as bridges, weirs, leats etc are marked and frequently labelled.

Modern Ordnance Survey Maps (MasterMap): Some features such as weirs not shown on historical maps are sometimes depicted on modern maps, but otherwise they are of limited use for identifying historic environment assets.

Vertical Aerial Photographs: A poor data source. Most watercourses are flanked by trees obscuring instream features. This problem becomes more acute the smaller the river/steam, especially so as most digital aerial photographs are taken when the leaves are on the trees. This data source is more useful on wider rivers, but then only to confirm the condition of features identified from other sources.

LiDAR: Of limited use. No previously unrecorded historic environment assets were identified using LiDAR. Even known assets are difficult to identify on LiDAR. Only 1m datasets were available in the pilot areas. It is possible that 25cm datasets may be more useful, where available.

Google Street View: A useful source of information for confirming the current condition of assets, such as bridges.

National River Flow Archive: Lists the flow stations in the UK with supporting data including photographs. This is a useful source for identifying modern weirs/barriers. There were no flow stations in the pilot areas. **https://nrfa.ceh.ac.uk/data/search**

Amber Barrier Atlas: This is a result of a Europe–wide project using citizen science to identify river barriers. Only major barriers are normally identified – most of which will have been picked up from other sources. There is some duplication of records on the atlas and locational data is not reliable; this is not, therefore, a particularly good data source, although it provides a useful check that all barriers have been picked up from other sources. **https://amber.international/european-barrier-atlas/**

Local Authority data: Local authorities maintain a geo-referenced database of all the stone bridges they are responsible for. For Pembrokeshire the database lists over 400 bridges.

NRW data: Enquiries to date indicate that NRW do not maintain a register of river barriers.

Pilot Study Areas

Gwendraeth Fach: Southeast Carmarthenshire. Part ex-industrial, part agricultural. Catchment area: 86sq km. Number of existing HER records: 50. Number of new HER records: 87. Total number of HER records: 137. This equates to c.1.8 historic assets per sq km. DAT has undertaken HER enhancement projects in parts of the Gwendraeth Fach catchment area and so the figure of 50 assets out of a total of 137 having existing records is cerainly on the high side. Across the region it is likely the average is around 10% of assets having existing records.

Eastern Cleddau: Central Pembrokeshire. Agricultural with some upland. Catchment area: 206 sq km. Number of existing HER records: c.45. Number of HER records needing creation: c.375. Total number of HER records on completion of project: c.420. Note: not all 375 new records will be created during this pilot. This equates to c.2.0 historic assets per sq km.

HER record creation

Work on the Gwendraeth Fach and Eastern Cleddau catchment areas has shown that on average there are approximately two river and riparian historic environment assets per square kilometre. The area of Wales is 20,779 sq km. It is estimated, therefore, that there are c.40,000 river and riparian historic environment assets in Wales.

Of these 40,000 assets, it is estimated that 10% (4000) are recorded on HERs, leaving 36,000 unrecorded assets. Work on the two pilot areas has demonstrated that it is possible to create 40-50 new records a day and enhance existing records. On this basis it will take between 720 and 900 and working days to create records for all riparian historic environment assets in Wales.

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