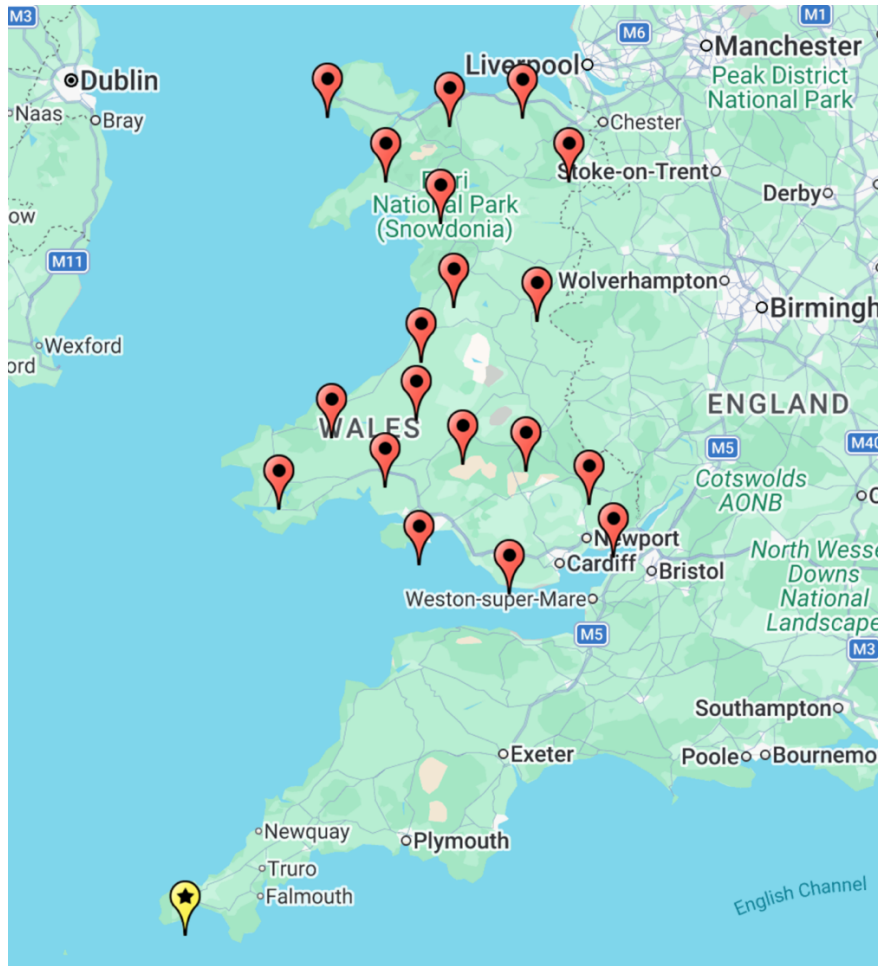


Benchmarks of Wales

Cut Marks and Rivets from the Ordnance Survey Levelling Archive

The Complete Thirteen County Series



<https://tinyurl.com/How-Wales-Was-Measured>



Carmarthenshire · Pembrokeshire · Ceredigion · Merionethshire · Caernarfonshire · Anglesey
Denbighshire · Flintshire · Montgomeryshire · Radnorshire · Brecknockshire · Monmouthshire · Glamorganshire

A History of the Benchmark

For close to two hundred years, the Ordnance Survey carried the shape of Britain across the land not with satellites but with a telescope, a staff, and a steady hand. The work began in earnest in the 1780s as a military survey, born from the fear of invasion and the need for accurate maps of the coast, but it grew into something far larger: an ambition to fix, once and for all, the exact position and height of every significant point in the country. The horizontal half of that ambition, the Principal Triangulation, gave Britain its network of trig pillars, the concrete pillars still found on hilltops today. The vertical half, quieter and far more numerous, gave Britain its benchmarks.

A benchmark records height rather than position. Early benchmarks were levelled from local, often arbitrary starting points, so that a height recorded near Cardiff and a height recorded near Chester could not always be compared with confidence. That problem was solved between 1912 and 1921, when the Ordnance Survey established Ordnance Datum Newlyn, calculated from tidal observations taken at Newlyn in Cornwall over those years. From that point on, every benchmark in mainland Britain could be read against the same fixed zero, mean sea level at that one small Cornish harbour, and a farmer in Ceredigion and an engineer in Glamorganshire were, for the first time, speaking the same vertical language.

The marks themselves came in a handful of forms, and this series has followed two of the most common. The cut mark is the familiar chiselled symbol, a horizontal bar sitting above a broad arrow, incised into a vertical face, a church wall, a bridge parapet, a gatepost, a milestone, wherever a stable and durable surface presented itself. The rivet is its counterpart for horizontal ground, a small brass or bronze stud set into rock, a step, or a road surface, used wherever no vertical face was available. Above these, in a hierarchy of increasing precision, sat the fundamental benchmarks and the network of first, second and third order levelling lines, first order running the length of the country to the most exacting standard, third order following almost every road and lane so that a surveyor, an engineer, or a farmer draining a field was never far from a point of known height.

For most of the twentieth century this network was living infrastructure, checked, repaired and extended as roads were built and buildings rose and fell. Its end came quietly. Aerial and satellite methods of establishing height overtook the old system through the 1970s and 1980s, and the Ordnance Survey formally ceased maintaining the benchmark network in the 1980s, England, Scotland and Wales together. From that date the record was frozen. No mark has been added, corrected or removed since, and none has been checked against the ground it stands on. The half a million or so marks recorded in the national archive are, in effect, a snapshot of Britain as it stood forty years ago, and every one of them may or may not still exist.

This project began, in the spring and summer of 2026, as an attempt to bring one small corner of that frozen archive back into use. It started with Carmarthenshire, a straightforward extraction of the county's cut marks and rivets onto an interactive map. It was only in reading the marks' own descriptions, the surveyor's terse shorthand naming the church, the farm, the bridge, the milk stand each mark was cut into, that the project changed shape: the archive was

not only a levelling network, it was an accidental inventory of the county's built and working history, left behind by surveyors who had no intention of writing one. From that recognition came the structure carried through every map in this series, county layers that preserve the levelling network as the Ordnance Survey built it, and thematic layers that read the same marks as local history.

The choice to map onto the thirteen historic counties, Sir Gaerfyrddin, Sir Benfro, Ceredigion, and the ten that follow them, rather than the twenty two modern authorities, was made deliberately, using boundaries digitised by the Royal Commission on the Ancient and Historical Monuments of Wales from the first edition Ordnance Survey mapping. These marks were cut by surveyors who worked to the older map, whose parish and county lines had stood since the sixteenth century reorganisation of Wales, and in several cases, most strikingly in Merionethshire and Flintshire, the old boundaries hold marks and even whole detached fragments of a county that the modern map would exile elsewhere. To map these marks onto their own historic ground is to read them as their surveyors would have understood them.

What follows is that reading, county by county: thirteen historic counties of Wales, 43,511 benchmarks in total, from a coastal mark of 1849 to the final confirmations of the 1990s, from the tidal levels of the Gwent coast to a rivet above Llanthony at 618 metres. Every one of them stands, at the time of writing, unvisited and unconfirmed. This project, and this document, is an invitation to change that, one parish, one chapel, one milk stand at a time.

How This Series Is Built

Each of the thirteen counties that follow is mapped in ten layers. Three county layers carry the complete record for that county, divided geographically, north, centre and south where the county runs tall, or west, centre and east where it runs wide, and preserve the levelling network exactly as the Ordnance Survey built it. Seven thematic layers then gather the same marks by the kind of place that bears them, Churches, Chapels and Cemeteries; Farms and Farm Buildings; Bridges and Railways; Milk Stands; Milestones, Guide Posts and Wayside Features; Village Landmarks; and Upland and Living Rock Marks, so that the same archive can be read either as a survey network or as an index to the buildings and features of the county. On the county layers, cut marks appear as burgundy circles and rivets as gold squares.

Each point on every map opens to show the full record for that mark: its National Grid reference, its height above Ordnance Datum Newlyn to the millimetre, the original Ordnance Survey description in its terse surveyor's shorthand, the order of the levelling line to which it belonged, the year it was last verified by an Ordnance Survey party, and a field status line. The archive locates each mark to a precision of ten metres, so a pin marks the immediate vicinity rather than the exact stone, and the original description is the surest guide to the mark itself once a searcher is standing on the ground.

The Benchmark Hunt

The archive records the network as it stood when maintenance ceased, and no mark on any of these maps is guaranteed to survive. Many will have been lost to demolition, rebuilding and road improvement in the decades since. That uncertainty is not a weakness of the maps but their invitation. Every entry carries a field status line, and every mark across all thirteen counties presently stands as unvisited. Each one is a small question waiting to be answered on foot.

These maps are offered as the starting point for a nationwide recording effort. A walker, a school class or a local history society can take the marks of their own square mile, seek them out on church, bridge and mountain rock, and record what still remains. Searching for benchmarks asks nothing more than a map, a sharp eye and a pair of boots, it costs nothing, and it takes people directly to the oldest buildings and quietest corners of their own community. The complete dataset behind every map can be exported and rebuilt as a copy of a searcher's own, so that a parish, a school or a society can make the recording work entirely their own while the county map itself remains the permanent reference.

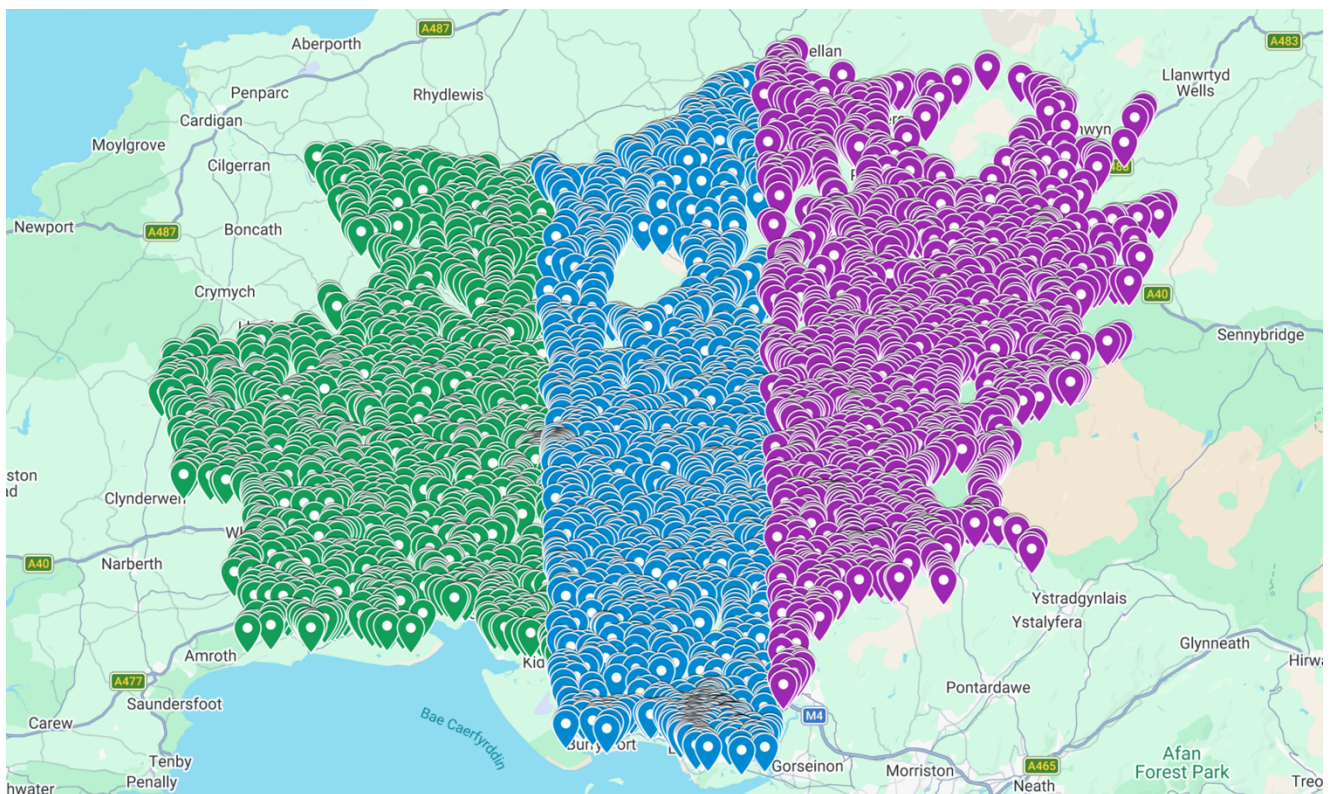
1. Carmarthenshire

Sir Gaerfyrddin

4,608 benchmarks · 3,671 cut marks · 937 rivets · 3.8m – 491.0m · 1878–1977

The pilot county for the whole series, and the county where the project changed direction: what began as a plan to plot cut marks and rivets became, on reading the marks' own descriptions, a wider inventory of the county as the surveyors found it. Its three layers run west to east from the Teifi valley and Pendine, through Carmarthen and Kidwelly, to Llandeilo, Llandovery and the Black Mountain. The earliest record on the map, a coastal mark of 1878, and the highest, a rivet at almost 491 metres near the summit of the Black Mountain pass, sit either end of a hundred year span.

The thematic layers here set the pattern followed by every county after it, and Carmarthenshire's milk stands layer, 252 marks on the roadside churn platforms of the dairying heartland, remains one of the largest of its kind found anywhere in the series.



<https://tinyurl.com/Carms-OS-Benchmarks-Map>

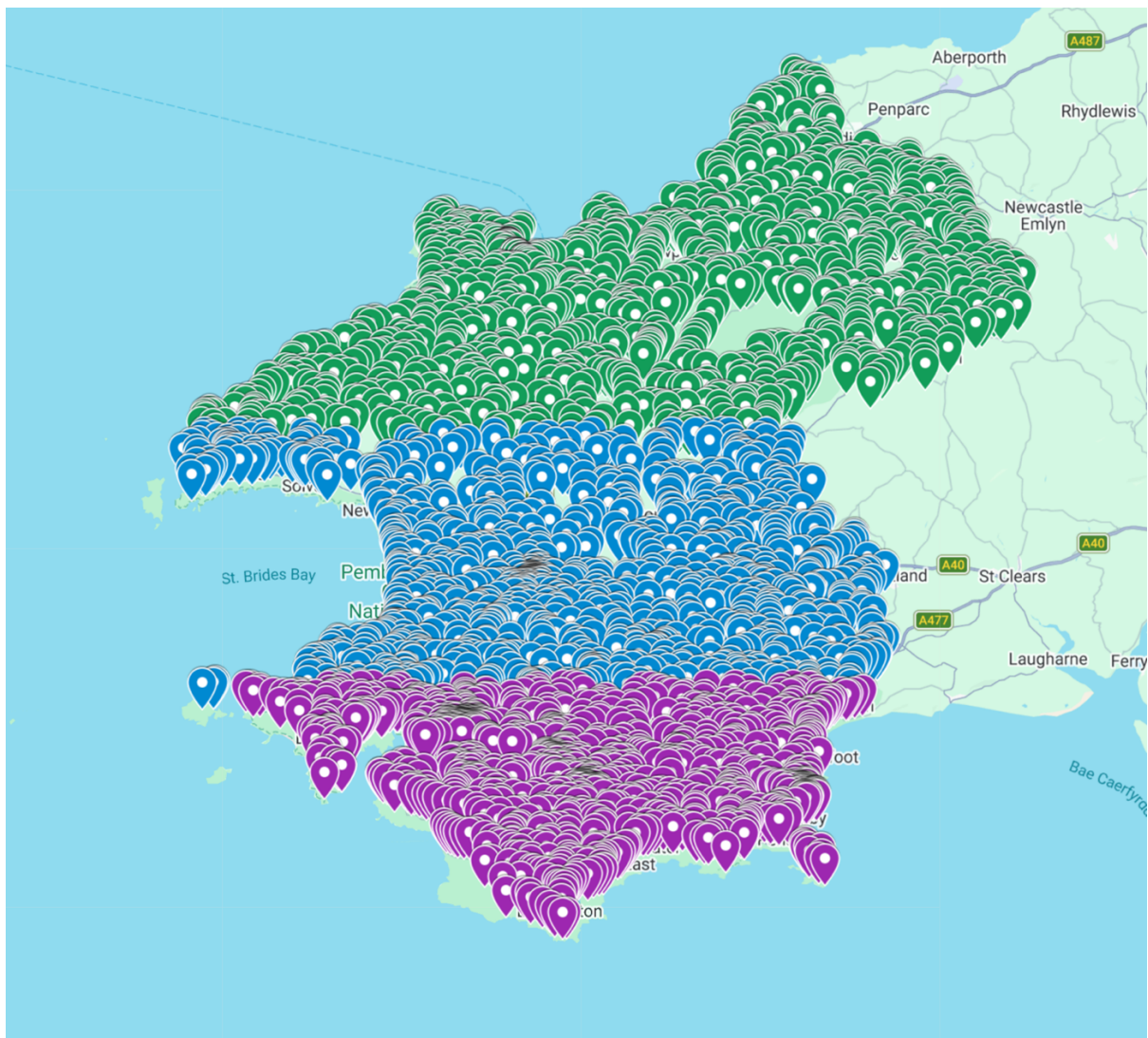


2. Pembrokeshire

Sir Benfro

3,521 benchmarks · 2,929 cut marks · 592 rivets · 3.5m – 405.6m · 1860–1990

The second county, spanning Preseli bluestone country in the north to the Milford Haven waterway and Pembroke in the south. Its record reaches deep into the nineteenth century, a Pembroke mark of 1860 predating Ordnance Datum Newlyn itself, while other marks were verified as late as 1990, one of the longest working spans found in the series. The 224 marks recorded on churches and chapels reflect the density of ancient parishes in the county of St Davids, and the farm names in the record read Welsh north of the old Landsker line and English south of it, so that the historic divide of Pembrokeshire survives in the levelling archive itself.



<https://tinyurl.com/Pembs-OS-Benchmarks-Map>

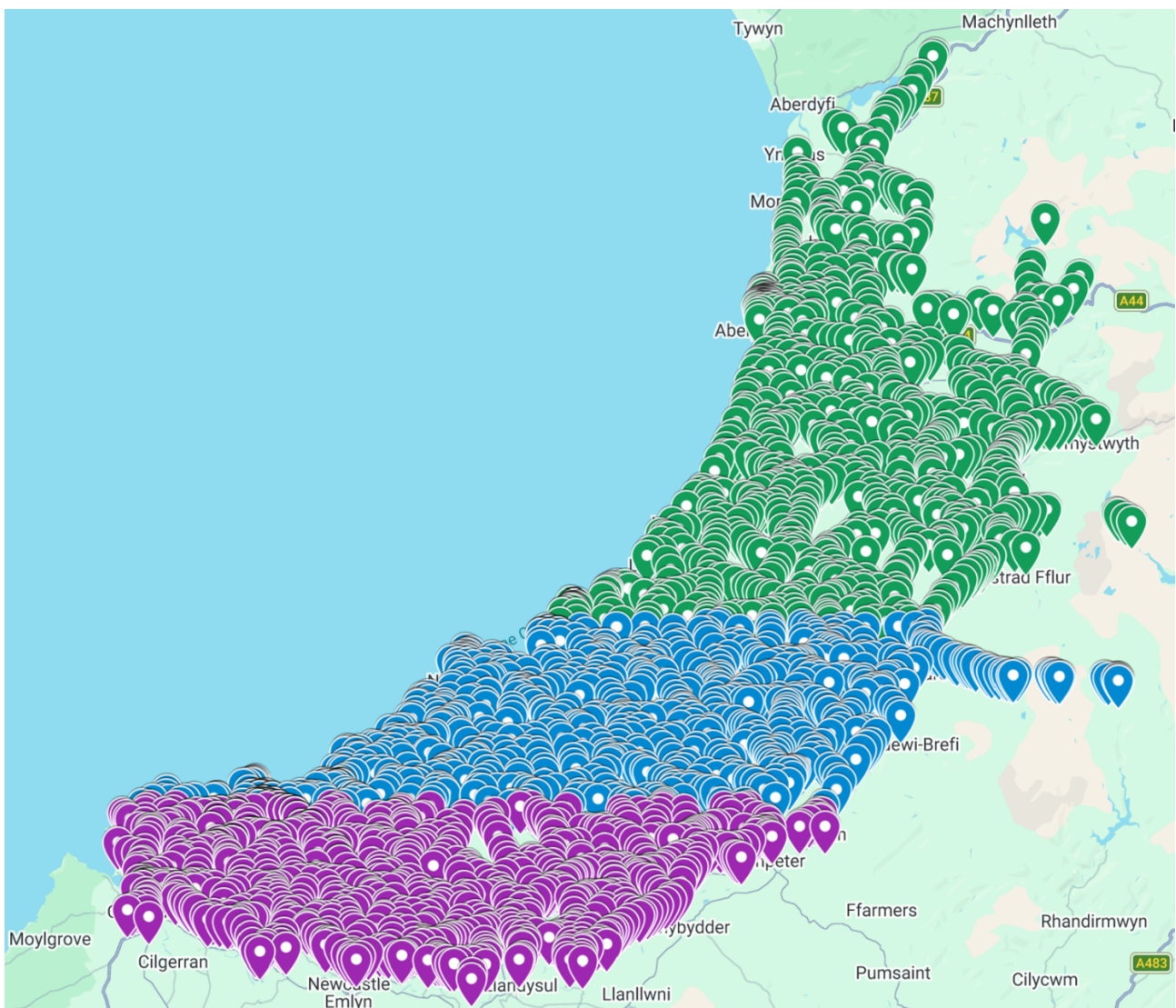


3. Ceredigion

Ceredigion

2,777 benchmarks · 2,167 cut marks · 610 rivets · 1.9m – 420.0m · 1849–1979

The third county, and with it the old Dyfed complete. Its earliest marks, four coastal records of 1849, are the oldest found anywhere in the whole series, survivors of the first primary levelling of Wales. Its highest point, 420 metres beside the old drovers' road from Tregaron to Abergwesyn, sits in some of the emptiest country in mid Wales. Cardiganshire was always dairying country above all, and its 218 recorded milk stands, second only to Carmarthenshire's, preserve the memory of the county whose families carried the milk trade to London.



<https://tinyurl.com/Ceredigion-OS-Benchmark-map>

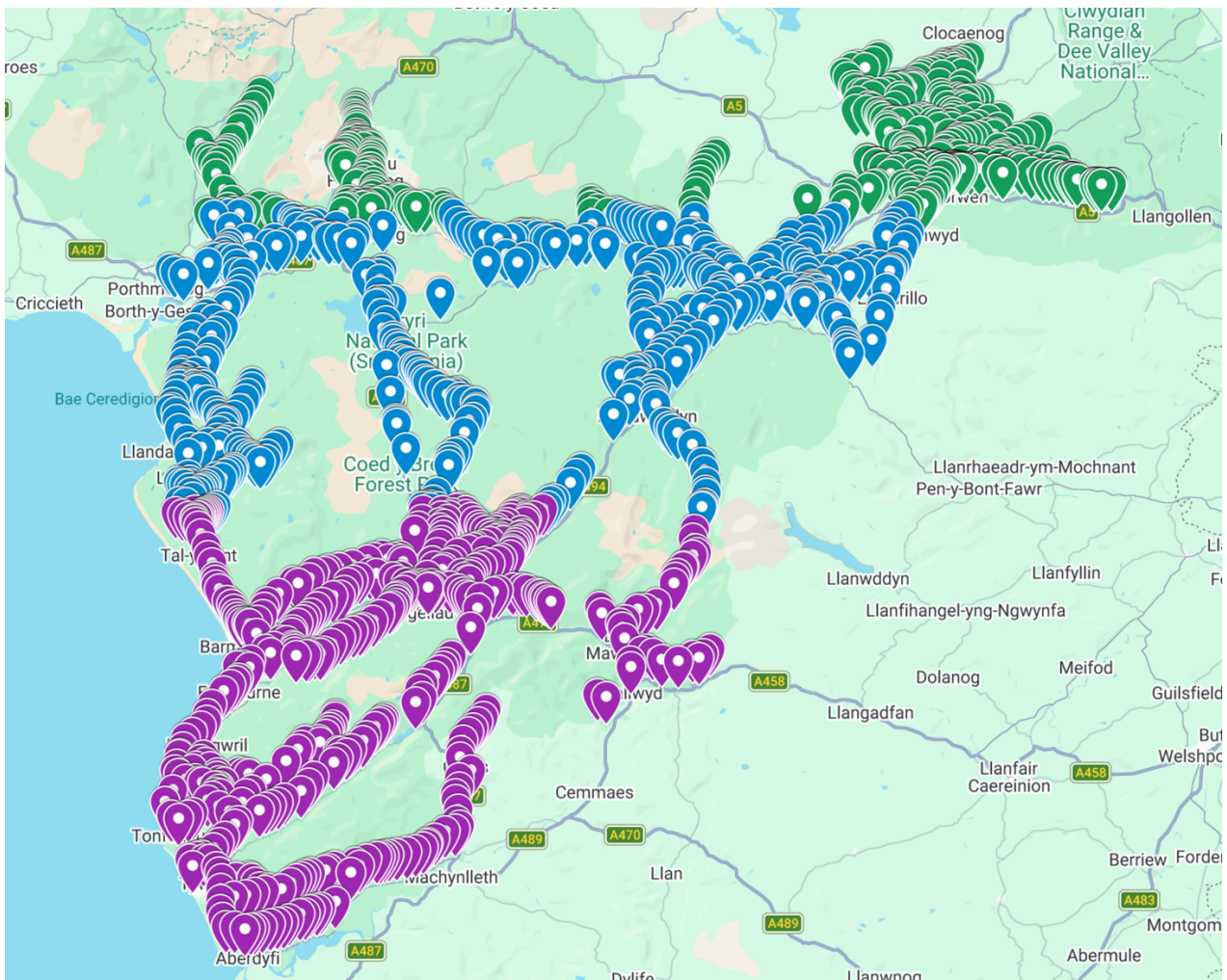


4. Merionethshire

Sir Feirionnydd

1,324 benchmarks · 1,072 cut marks · 252 rivets · 2.9m – 544.7m · 1855–1992

The fourth county, and the first drawn on the historic county boundary rather than a modern equivalent, a choice that paid off immediately: the oldest mark in the entire series, a cut mark of 1855 in the Dee valley at Llandrillo, lies in Edeirnion, ground the modern map would assign elsewhere. The highest mark found anywhere in the series to that point, 544.7 metres at Bwlch y Groes, the highest public road pass in Wales, crowns a county that is more mountain than anywhere mapped before it. Its milk stands layer holds just two marks, against 252 in Carmarthenshire, the clearest single sign in the series of where dairying country gives way to sheep and mountain.



<https://tinyurl.com/Merion-OS-Benchmark-Map>

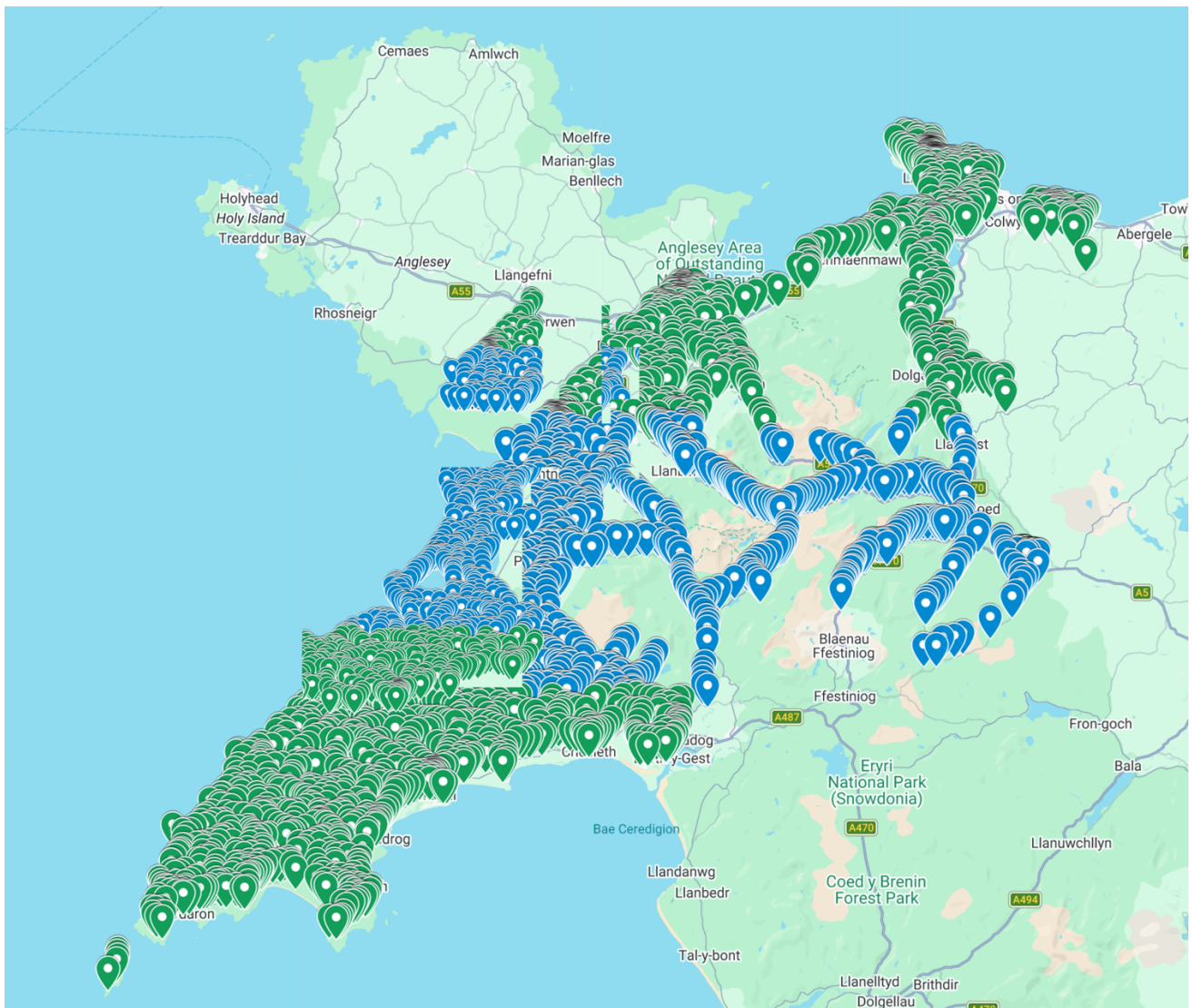


5. Caernarfonshire

Sir Gaernarfon

2,555 benchmarks · 2,080 cut marks · 475 rivets · 1.6m – 475.4m · 1852–1992

Snowdon country, the fifth county. Its highest mark, a rivet cut into rock at 475.4 metres on the mountain's own flank, stands as close to the roof of Wales as any benchmark reaches, the summit itself always having been fixed by trigonometrical pillar rather than the levelling network. Four marks above Llanberis and at Fort Belan carry a rare trace of the earlier Liverpool Datum, used before the national system was unified, preserved here by accident in an archive otherwise built entirely on Ordnance Datum Newlyn.



<https://tinyurl.com/Caernarf-OS-Benchmark-Map>

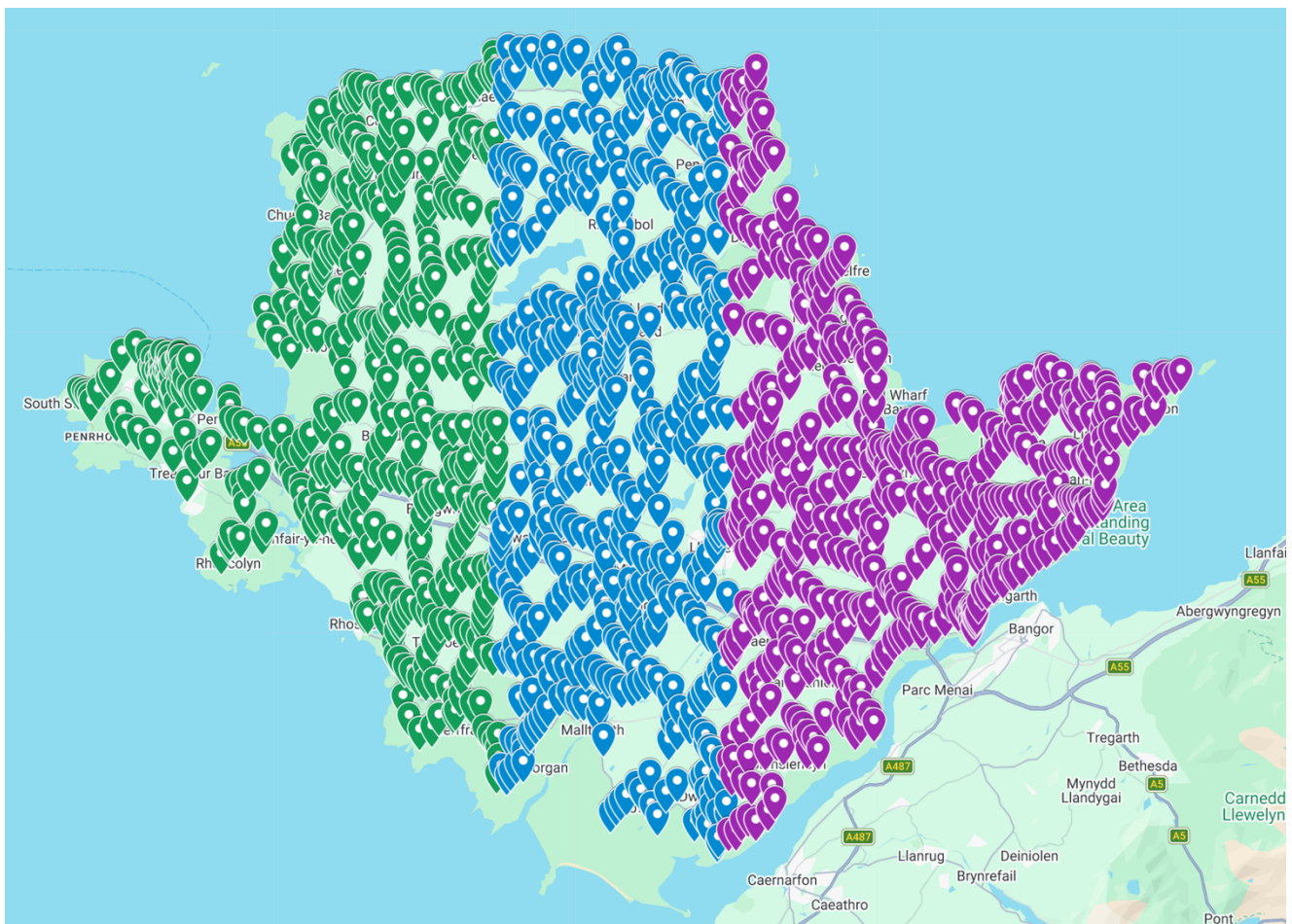


6. Anglesey

Ynys Môn

1,491 benchmarks · 1,321 cut marks · 170 rivets · 2.3m – 145.9m · 1851–1982

The sixth county, and the first to break the mountain pattern: Ynys Môn's highest mark reaches barely 146 metres, lower than the lowest mountain pass mapped before it, and its three layers run west, centre and east rather than north to south to suit the island's shape. Churches, Chapels and Cemeteries becomes the largest thematic layer for the first time in the series, 97 marks, fitting an island renowned for the density and antiquity of its parishes, while seven marks near Pentraeth carry the fundamental order zero classification, an unusually tight concentration of the most precise class of levelling found anywhere in this project.



<https://tinyurl.com/Anglesey-OS-Benchmark-Map>

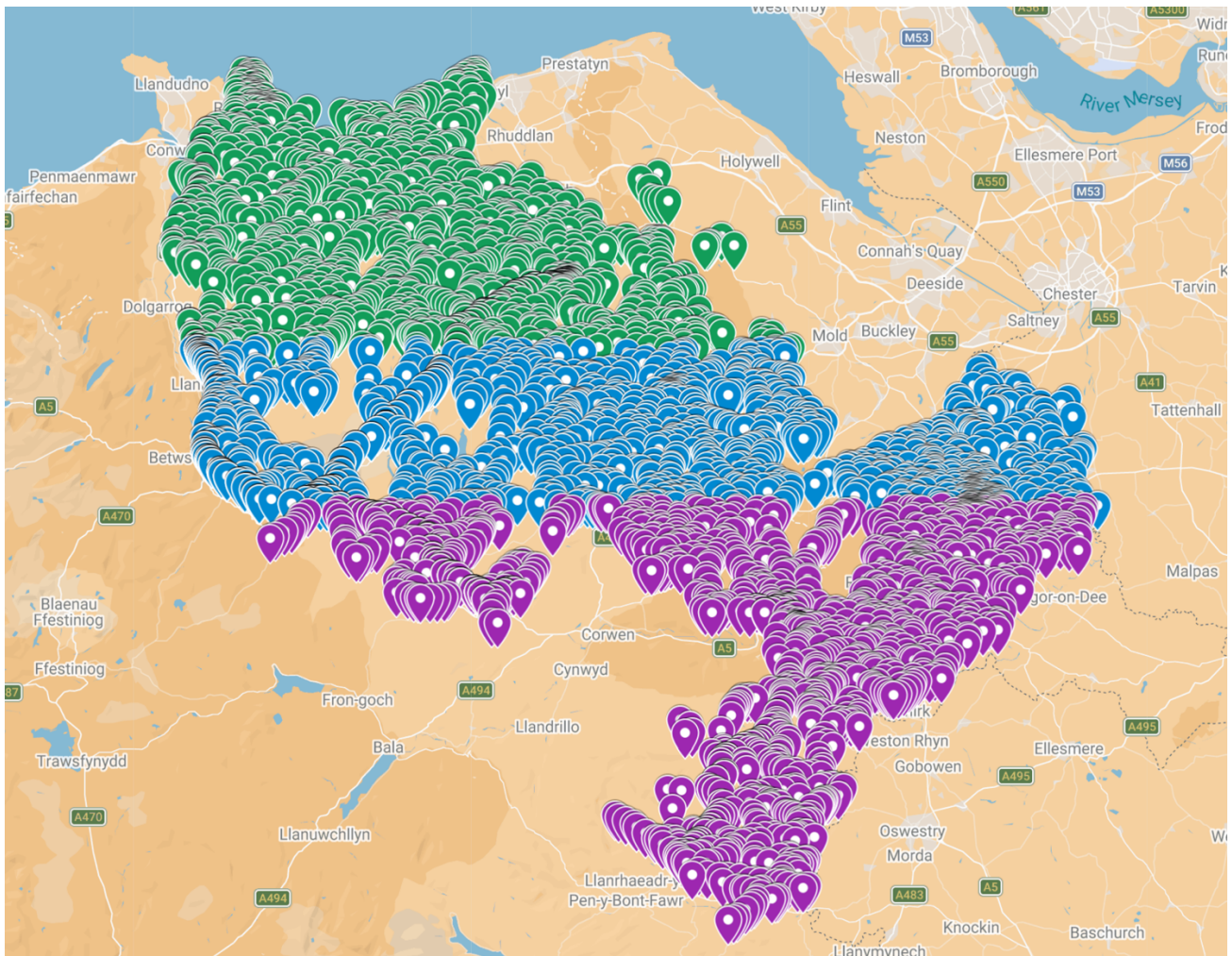


7. Denbighshire

Sir Ddinbych

4,525 benchmarks · 3,552 cut marks · 973 rivets · 4.2m – 532.7m · 1855–1979

The seventh county, and the largest county total mapped up to that point, 4,525 benchmarks. Upland and Living Rock becomes the largest thematic layer found anywhere in the series so far, 862 marks, well over half the county's entire thematic total, a single figure that says more about the dominance of the Clwydian Range and the Berwyn mountains than any other statistic on the map. Offa's Dyke Path runs the length of the Clwydian ridge, directly across the county's densest concentration of unvisited marks.



<https://tinyurl.com/Denbigh-OS-Benchmark-Map>

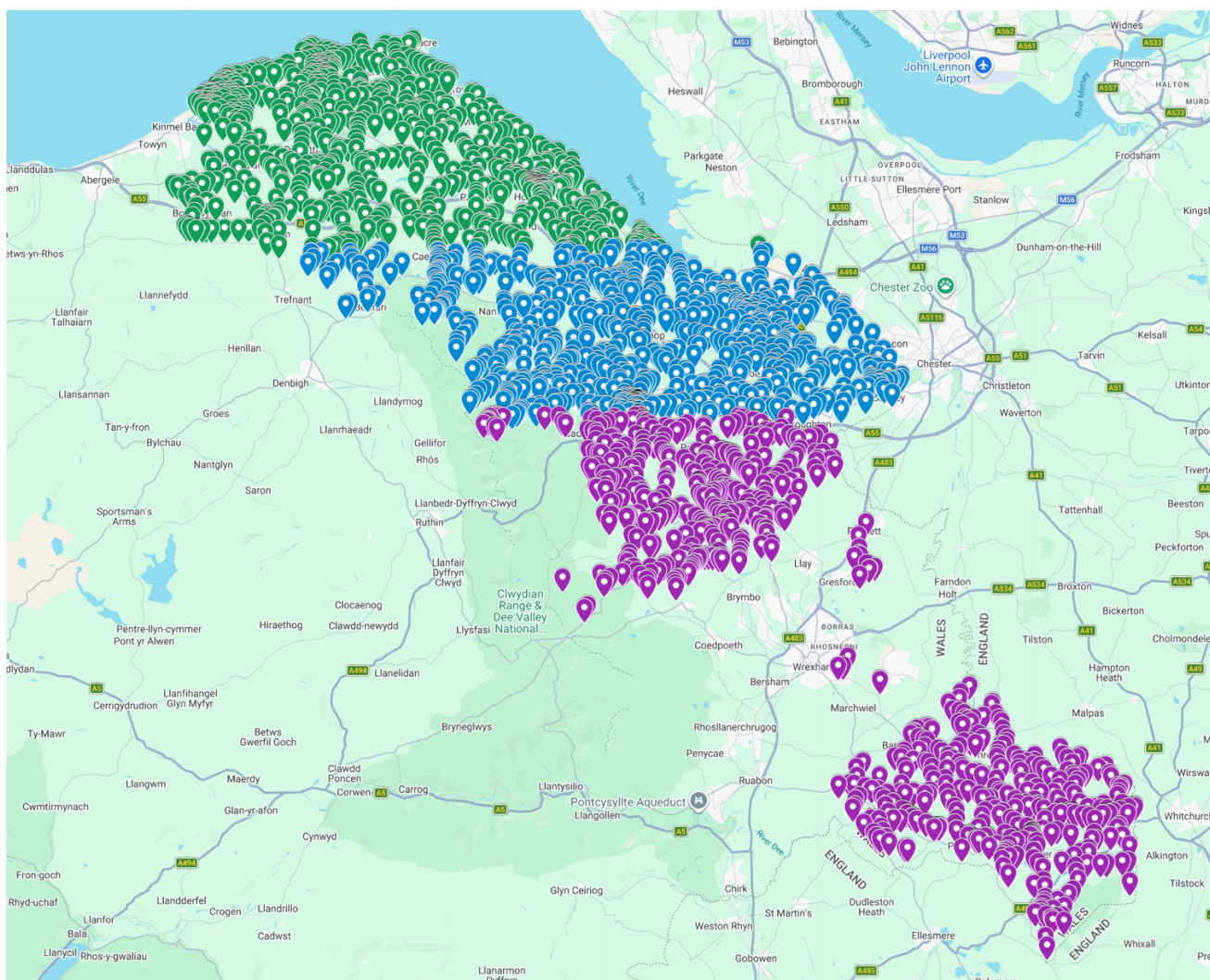


8. Flintshire

Sir y Fflint

2,477 benchmarks · 2,186 cut marks · 291 rivets · 3.6m – 554.4m · 1852–1972

The eighth county, and historically the most unusual: alongside its main territory along the Dee estuary, historic Flintshire held Maelor Saesneg, a genuine detached exclave lying wholly within Denbighshire around Overton on Dee, a medieval land holding pattern that survived four hundred years until 1974. Sixty six marks on this map, one in every thirty eight, belong to that separated island of the county. Flintshire is also the first county in the series to record no milk stands at all, its economy by this era shaped by coal, lead and heavy industry along the Dee rather than dairying.



<https://tinyurl.com/Flintshire-OS-Benchmark-Map>

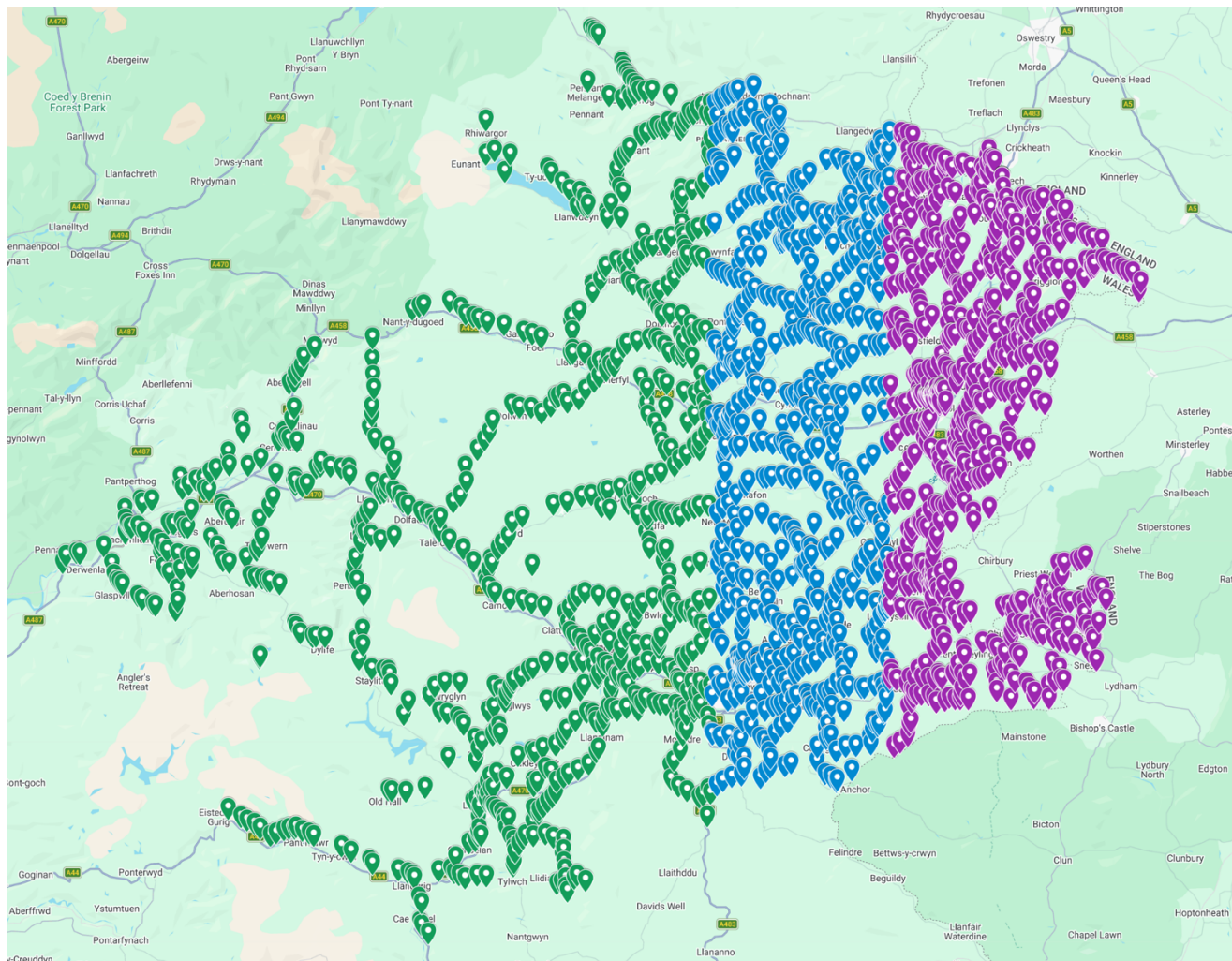


9. Montgomeryshire

Sir Drefaldwyn

2,377 benchmarks · 1,853 cut marks · 524 rivets · 4.4m – 507.3m · 1852–1979

The ninth county, and the first landlocked county in the series: a long border shire running from the Cambrian Mountains to the Severn, its record carries no coastline and no low ground at all, the lowest mark in the whole county still 59 metres above Ordnance Datum. Its highest point, 507.3 metres near the source of the Severn, sits close to the springs of two of Britain's great rivers, the Severn and the Wye both rising within this county's bounds.



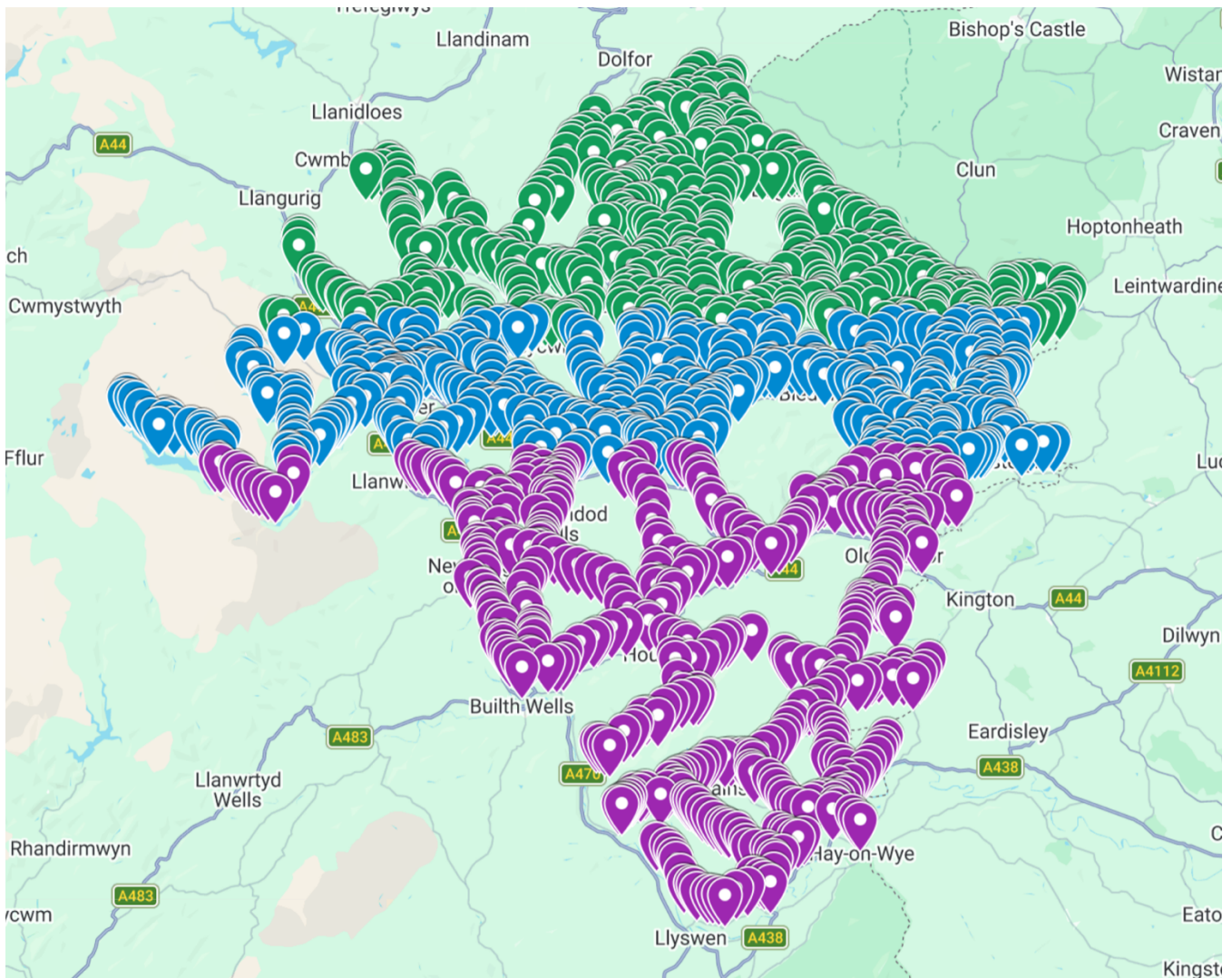
<https://tinyurl.com/Montgomery-OS-Benchmark-Map>



Sir Faesyfed

1,396 benchmarks · 705 cut marks · 691 rivets · 82.3m – 479.5m · 1952–1977

The tenth county, and the most tightly dated of any mapped in this series: every one of its 1,396 marks was verified within a single twenty five year window, 1952 to 1977, with not one record surviving from before the Second World War, a genuine curiosity beside the Victorian traces found in every county before it. It is also the most evenly balanced county between the two kinds of mark, rivets making up very nearly half the total, and the least populous historic county in Wales, its empty sheep walks leaving bare rock as the surveyor's most constant companion, close to a third of the county's entire record.



<https://tinyurl.com/Radnor-OS-Benchmark-Map>

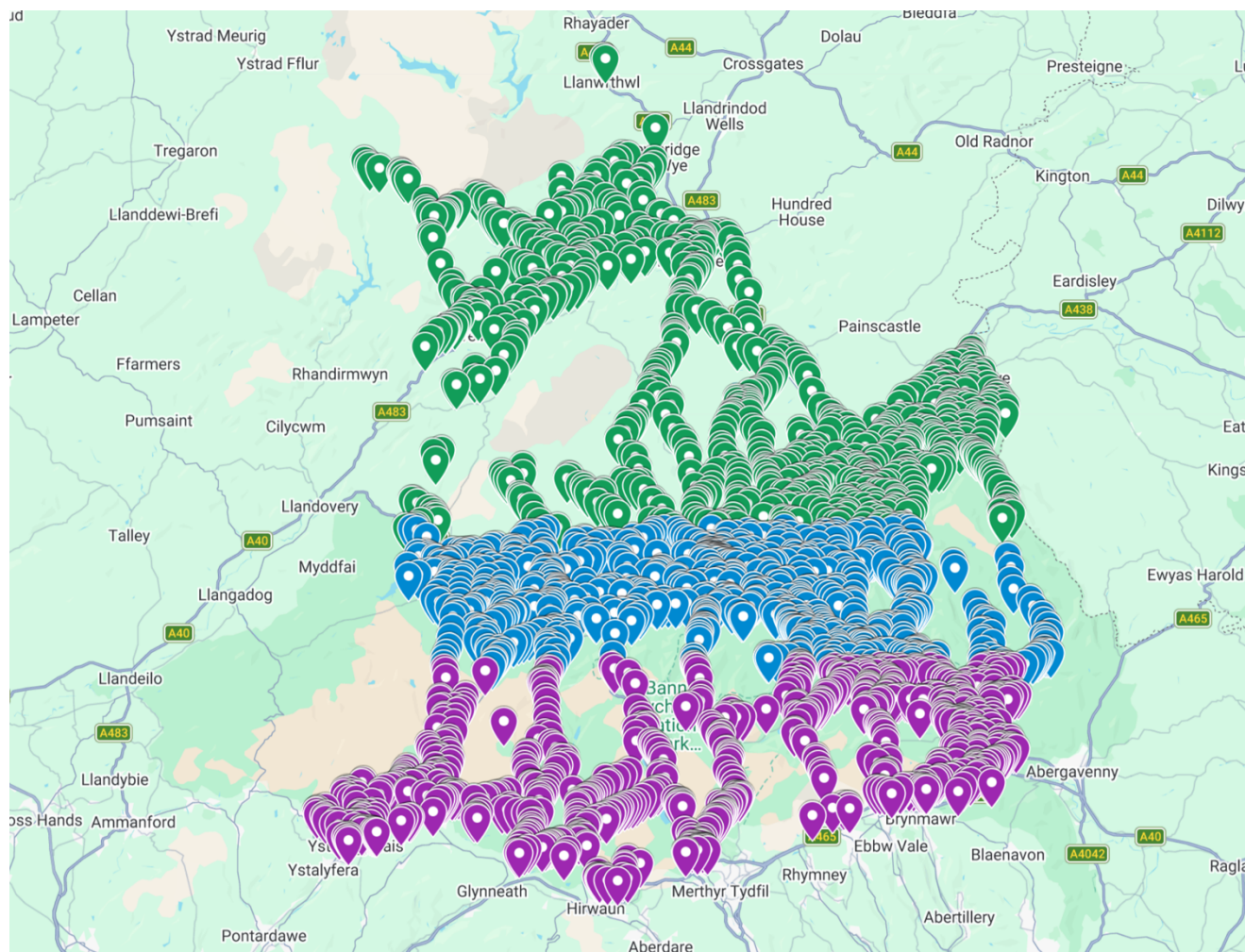


11. Brecknockshire

Sir Frycheiniog

2,610 benchmarks · 1,792 cut marks · 818 rivets · 62.1m – 592.1m · 1913–1979

The eleventh county, and the heart of the Brecon Beacons, setting a new high point for the series: a rivet at 592.1 metres in a stream culvert above Crickhowell, the tallest benchmark found in any county mapped so far. The earliest mark in the county, cut into a stone gatepost in 1917 while the First World War was still being fought, is the oldest wartime record found anywhere in this project. Upland and Living Rock again dominates, 596 marks, close to half the county's thematic total.



<https://tinyurl.com/Brecon-OS-Benchmark-Map>

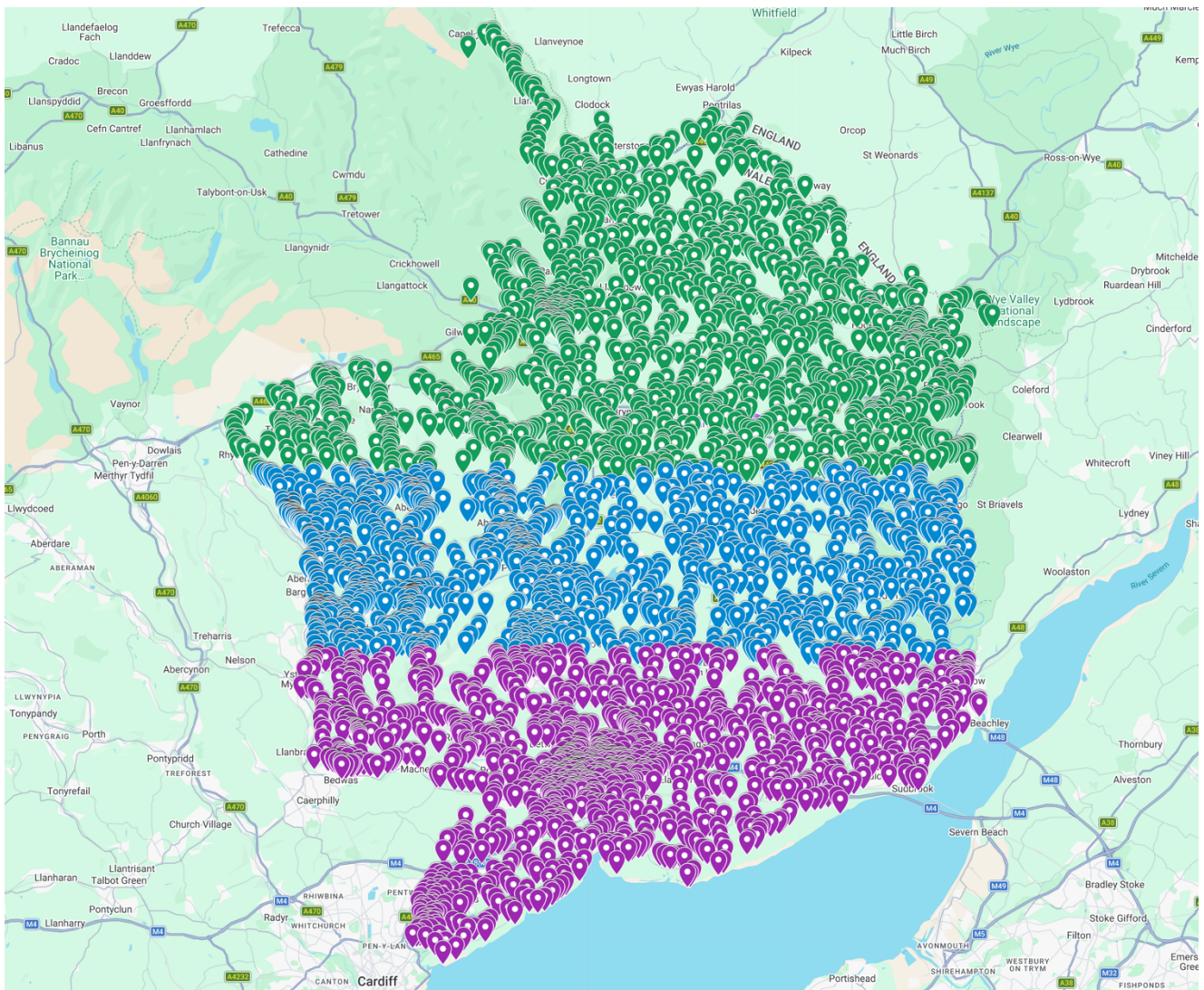


12. Monmouthshire

Sir Fynwy

4,854 benchmarks · 3,952 cut marks · 902 rivets · 3.8m – 618.1m · 1876–1986

The twelfth county, and the record breaker of the series in two respects at once: its highest mark, a rivet at 618.1 metres above Llanthony that the original survey description names, in an unusually vivid piece of shorthand, the Blacksmiths Anvil, stands as the tallest point recorded anywhere in this project, and its 107 marks of the fundamental order zero classification outnumber every other county in the series combined. A rivet cut directly into the earthwork of a castle mound near Newport, rather than into any building raised upon it, is one of the rarer records found in the whole archive.



<https://tinyurl.com/Monmouth-OS-Benchmark-Map>

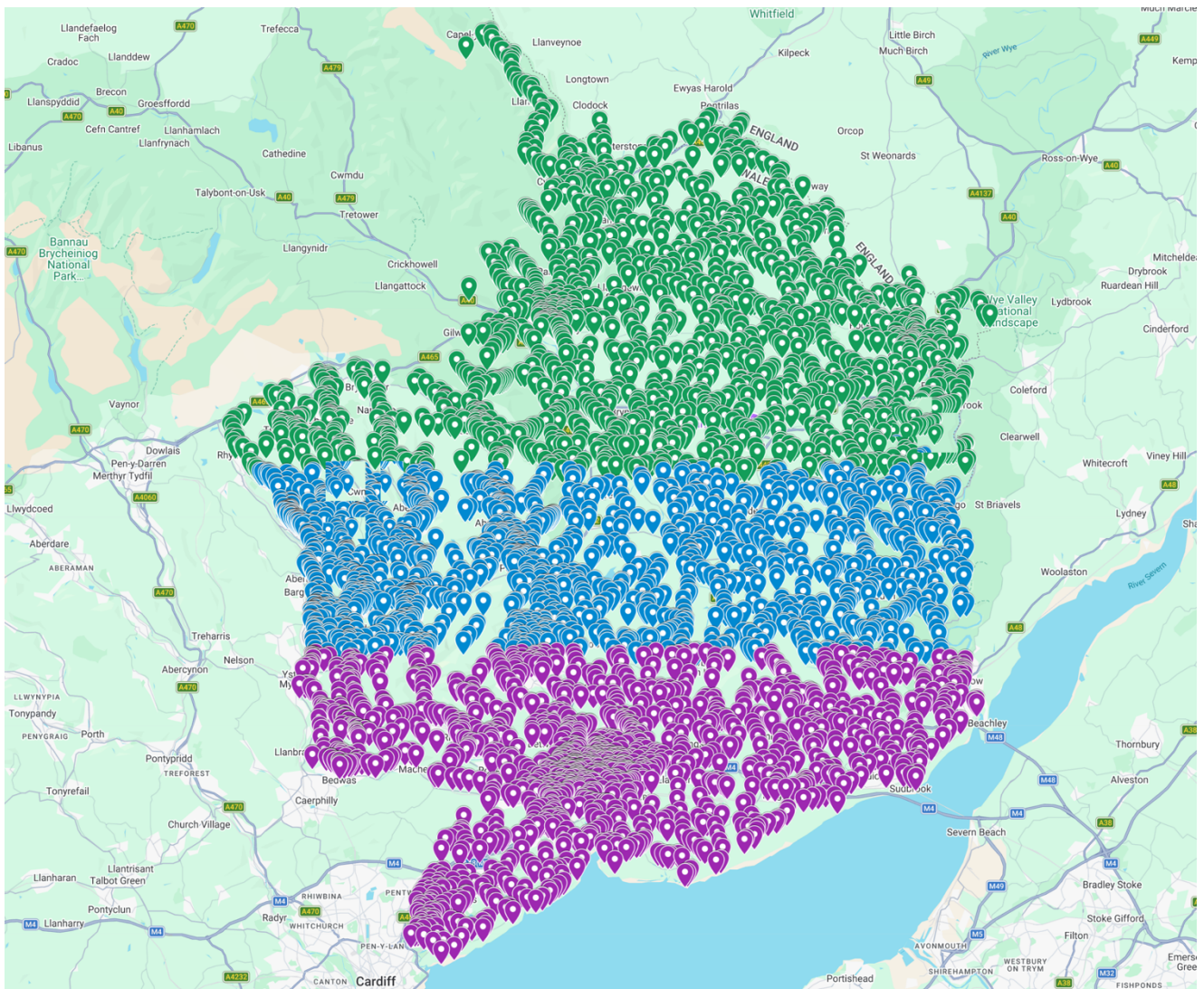


13. Glamorganshire

Sir Forganwg

8,996 benchmarks · 7,178 cut marks · 1,818 rivets · 3.5m – 565.6m · 1868–1991

The thirteenth and final county, and by a wide margin the largest, 8,996 benchmarks stretching from the cliffs of the Gower to the docks of Cardiff and the high moorland rim above the coal valleys. Bridges and Railways and Village Landmarks both set new series highs here, 768 and 447 marks, a direct reflection of the densest railway network and the fastest nineteenth century urban growth found anywhere in Wales, while 179 order zero marks, the largest concentration in the series, trace the exacting demands of surveying a capital city and its industrial hinterland. With this county the series is complete.



<https://tinyurl.com/Glamorgan-OS-Benchmark-map>



The Data Ledger

The table below sets every county in the series side by side: the total number of benchmarks mapped, the split between cut marks and rivets, the range of heights recorded, the span of verification years, and the number of records confirmed before 1950. Together the thirteen rows and their total form a single statistical portrait of the whole project.

County	Total	Cut Marks	Rivets	Height Range (m)	Years	Pre-1950
Carmarthenshire	4,608	3,671	937	3.8 – 491.0	1878–1977	63
Pembrokeshire	3,521	2,929	592	3.5 – 405.6	1860–1990	6
Ceredigion	2,777	2,167	610	1.9 – 420.0	1849–1979	87
Merionethshire	1,324	1,072	252	2.9 – 544.7	1855–1992	137
Caernarfonshire	2,555	2,080	475	1.6 – 475.4	1852–1992	89
Anglesey	1,491	1,321	170	2.3 – 145.9	1851–1982	3
Denbighshire	4,525	3,552	973	4.2 – 532.7	1855–1979	111
Flintshire	2,477	2,186	291	3.6 – 554.4	1852–1972	108
Montgomeryshire	2,377	1,853	524	4.4 – 507.3	1852–1979	131
Radnorshire	1,396	705	691	82.3 – 479.5	1952–1977	0
Brecknockshire	2,610	1,792	818	62.1 – 592.1	1913–1979	23
Monmouthshire	4,854	3,952	902	3.8 – 618.1	1876–1986	201
Glamorganshire	8,996	7,178	1,818	3.5 – 565.6	1868–1991	386
All Thirteen Counties	43,511	34,458	9,053	1.6 – 618.1	1849–1992	1345

Thematic Layer Totals by County

The second table gives the count for each of the seven thematic layers, county by county, showing at a glance where each theme is strongest: the milk stands of Carmarthenshire and Ceredigion, the upland and rock marks that dominate the mountain counties, and the bridges and village landmarks that mark out the industrial valleys of Glamorganshire.

County	Churches	Farms	Bridges	Milk	Wayside	Village	Upland
Carmarthenshire	150	448	441	252	50	133	217
Pembrokeshire	224	455	205	51	25	143	70
Ceredigion	94	139	224	218	44	44	130
Merionethshire	38	22	111	2	13	23	160
Caernarfonshire	87	49	152	12	29	54	98

County	Churches	Farms	Bridges	Milk	Wayside	Village	Upland
Anglesey	97	53	67	5	11	18	16
Denbighshire	132	236	255	20	60	79	862
Flintshire	109	258	146	0	24	62	91
Montgomeryshire	100	217	196	5	25	50	265
Radnorshire	52	92	163	0	32	24	407
Brecknockshire	106	191	264	3	24	56	596
Monmouthshire	254	436	437	5	64	219	496
Glamorganshire	415	330	768	3	30	447	871
All Thirteen Counties	1858	2926	3429	576	431	1352	4279

Closing Reflection

Thirteen historic counties of Wales, 43,511 Ordnance Survey benchmarks in total, from a coastal mark of 1849 in Ceredigion to the final confirmations of the 1990s, from the tidal levels of the Gwent coast to a rivet above Llanthony at 618 metres, now stand recorded county by county, each with its own three county layers preserving the levelling network as the Ordnance Survey built it, and its own seven thematic layers reading the same marks as local history. Along the way the series turned up genuine discoveries that no single county map could have shown on its own: a detached fragment of Flintshire lying entirely within Denbighshire, a solitary trace of the pre-standardisation Liverpool Datum on the shore of the Menai, a hundred and seven marks of the most exacting precision clustered around Newport, and a steadily rising record of the highest point reached, from 491 metres in Carmarthenshire to 618 metres in Monmouthshire, that traces the geography of Wales itself from the gentle southwest to the mountainous border.

The levelling network these marks served has passed into history, but the marks themselves belong to the heritage of every community that holds one. Every entry across all thirteen counties presently stands as unvisited, and the invitation behind this entire project is a simple one: that a school, a walking group or a local history society might take the marks of their own parish, seek them out, and begin to turn that word, unvisited, into a record of what still survives.

It is hoped, too, that the method behind this series, turning a forgotten national survey archive into a tool for local discovery, might in time be carried beyond Wales, wherever the same Ordnance Survey benchmark archive reaches.

Sources

Ordnance Survey benchmark archive, complete dataset for Great Britain, from which all thirteen county records were extracted. Contains Ordnance Survey data © Crown copyright and database right 2026.

Historic county boundaries from the Historic County Boundaries of Wales dataset, digitised from first edition Ordnance Survey mapping. © Crown Copyright, Royal Commission on the Ancient and Historical Monuments of Wales, available under Open Government Licence 3.0.

Ordnance Survey documentation on the national levelling network, benchmark types, Ordnance Datum Newlyn and the historic Liverpool Datum.

Coordinate conversion from OSGB36 National Grid to WGS84 carried out for online mapping, with all positions treated as approximate to ten metres pending field verification.

A note on publication: Carmarthenshire and this master volume have been uploaded to People's Collection Wales separately from the remaining twelve counties, and deliberately so, as a working pair that lets the full format, county layers, thematic layers, and companion document alike, be explored before the rest of the series follows individually.

A Closing Statement

This series began as an attempt to plot a few thousand forgotten survey marks across a single Welsh county. It closes as a complete record of an entire nation's benchmark archive, thirteen historic counties, 43,511 marks, and a shared invitation to walk out and find them. Whatever becomes of this project next, whether it is read for its history, used for education, or simply walked for its own sake, it stands complete as offered: a nation once measured by its surveyors, now offered back to its people to measure again on foot.

This document is also available as a full flipbook edition for easy browser reading and sharing:

<https://tinyurl.com/Benchmarks-of-Wales-FB>

