Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP)

ERAMMP Technical Annex-105TA1S12: Wales National Trends and Glastir Evaluation Supplement-12: Public Rights of Way

Monkman, G.

UK Centre for Ecology & Hydrology

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UKCEH contact details Bronwen Williams
UK Centre for Ecology & Hydrology (UKCEH)
Environment Centre Wales, Deiniol Road, Bangor, Gwynedd, LL57 2UW
01248 374500
erammp@ceh.ac.uk

Corresponding author Graham Monkman, UK Centre for Ecology & Hydrology
gramon@ceh.ac.uk

Authors Monkman, G.

[1]UKCEH

Contributing authors & reviewers

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Approved by Bridget Emmett (UKCEH)
James Skates (Welsh Government)

Abbreviations Used in this Report

BOAT	Byway Open to All Traffic
PROW	Public Rights of Way
RUPP	Road Used as a Public Path
UKCEH	UK Centre for Ecology & Hydrology

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1 INTRODUCTION AND PURPOSE

There is a large body of peer-reviewed evidence indicating that access to green spaces and the countryside has multiple socioeconomic and wellbeing benefits as indicated by the ~1.7M search results on Google Scholar (Google, 2024). Recognition of these benefits was a contributing driver to the codification of the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way Act 2020 (Bennett & Tranter, 1997; UK Government, 1981; UK Government, 2000). These acts – and other legislative instruments – make provision for the public to use Public Rights of Way (PROWs) and land for recreational purposes.

These acts also provide instruments to require and enable Local Authorities to maintain a register of PROWs and to enforce the maintenance and improvement of PROWs (or otherwise to enter into financial agreements with landowners, occupiers and tenants to make such improvements). The field survey elements of the GMEP (2013-16) and ERAMMP (2021-ongoing at 2024) projects are an opportunity to collect data on the temporal changes in PROW condition as part of the randomised sampling design of the national trends sample squares. Additionally, Glastir has multiple options targeted at improving PROW access and signage (Appendix 1). In the Historic Landscapes and Access report chapter, we consider the following 4 indicators:

- Proportion of PROWs by length assessed as having open access
- Proportion of PROWs by length assessed as having blocked access
- Proportion of PROWs by length assessed as being signed
- Proportion of PROWs by length assessed as being not blocked (i.e. poor or open) and signed

These four indicators were calculated from separate data stratifications to determine (i) how the indicators changed across Wales between 2013-16 and 2021-23 (National Trend); and (ii) if the magnitude by area of Glastir option uptake affected the four indicators (Glastir Effect).

2 METHODOLOGICAL DETAIL

2.1 General Processing and Tools

All processing was carried out in ESRI ArcGISPro 3.2, Python 3.9 or R 4.4.0. Any spatial conversions to British National Grid used the OSGB to NAD7 geographic translation.

ERAMMP field survey data were collected using ESRI ArcGIS Online by field surveyors following the ERAMMP Birds Field Survey Handbook (Siriwardena & Bowgen, 2023). All data went through a quality assurance process for referential and spatial integrity, and data domain validation. These analyses included data collected under GMEP where the data collection methods were identical to that under Siriwardena & Bowgen (2023). The selection of squares under GMEP and then for ERAMMP resurveys is given in (Jarvis, 2025)

2.2 Validation, Standardisation, PROW Categories and Survey Coding

The register of PROWs was provided by Welsh Government under the GMEP project. The PROW Register provided the extents of PROWs within each square as polyline vectors. Note that the PROW Register may omit some known PROWs such as coastal paths and other PROWs which are marked as public access on, for example OS Explorer maps.

The extents of all surveyed PROWs were manually reviewed. Errors in spatial location were manually corrected in reference to the PROW Register. All recorded PROWs outside of the GMEP-300 squares were deleted.

For statistical analysis and to compare with the available data analysed under GMEP (Emmett & GMEP Team, 2017), it is necessary to standardise the surveyed PROW lengths within each square to derive a ratio-like value. Proportional lengths were derived using the PROW Register where ERAMMP surveyed PROWs were manually matched and/or corrected to the PROW Register.

The PROW Register classified PROWs under 4 categories as recognised under UK legislation:

- Footpath - A conclusive right of passage for the benefit of pedestrians only.
- Bridleway - A conclusive right of passage for the benefit of pedestrians and horse riders, and possibly pedal cyclists.
- Road Used as a Public Path (RUPP) - A conclusive right of passage for the benefit of pedestrians and horse riders, and possibly motor vehicles and pedal cyclists.
- Byway Open to All Traffic (BOAT) - A right of passage provided for all classes of user, including motorised vehicles.

Surveyed PROW categories were assigned by spatially joining to the nearest feature in the PROW Register after buffering surveyed PROWs to 2.5 meters (i.e. a 5-meter width). Outputs were manually reviewed and corrected as required to derive the surveyed lengths by PROW categories.

The survey methodology recorded a two-letter code evaluating pedestrian accessibility and PROW signage presence at code positions 1 and 2 respectively (Table 2.1) for surveyed PROWs. Water damaged PROWs were recorded as WD. As an example, an Open and Signed path would be recorded as “OS”.

Table 2-1. PROW assessment codes. Where a PROW is assigned a letter from Access Code and Sign Code or, exclusively, WD to indicate water damage.

Access Code	Sign Code
O – Open (Easily Traversable	**S** – Signed
P – Poor (Passible Obstacles)	**N** – Not Signed
B – Blocked	
WD – Water Damaged (Not used with Access or Sign Codes)	

2.3 Calculation and Statistical Analysis of Indicators

National Trend and Glastir Effect analysis used the four previously defined indicators and the standardised PROW data as defined in section 2.2. Proportion calculations are shown here, however these were expressed as percentages in the main report to improve readability.

All statistical analysis as shown in the combined National Trend and Glastir Effect graphs used the proportional by-square indicator values (Table 2-2), but differed in the subset of squares used for each analysis.

Table 2-2. Calculation of a value for each square and each indicator, primarily used in statistical analysis. The square is our sampling unit. We had data for 315 squares across ERAMMP and GMEP of which 106 were repeats. See Table 2-1 for the PROW assessment codes which are indicated in the variable subscripts.

Indicator	By-Square Proportion (B_{sq}), for any given square
Open Access	$B_{sqOA} = (l_{ON} + l_{OS}) \Big/ (l_{BN} + l_{BS} + l_{ON} + l_{OS} + l_{PN} + l_{PS} + l_{WD})$
Blocked Access	$B_{sqBA} = (l_{BN} + l_{BS}) \Big/ (l_{BN} + l_{BS} + l_{ON} + l_{OS} + l_{PN} + l_{PS} + l_{WD})$
Signed Access	$B_{sqSA} = (l_{BS} + l_{OS} + l_{BS}) \Big/ (l_{BN} + l_{BS} + l_{ON} + l_{OS} + l_{PN} + l_{PS} + l_{WD})$
Not Blocked and Signed	$B_{sqNBS} = (l_{OS} + l_{PS}) \Big/ (l_{BN} + l_{BS} + l_{ON} + l_{OS} + l_{PN} + l_{PS} + l_{WD})$

National Trend and Glastir Effect tabulated values were calculated across all squares, and ***not*** by averaging B_{sq} for each indicator (Table 2-2). Calculating across squares makes the indicator value resistant to skew from squares with low assessed PROW lengths.

Table 2-3. Calculation of tabulated values for each indicator in the main report, calculated across all squares. See Table 2-1 for the PROW assessment codes which are indicated in the variable subscripts.

Indicator	Across-Square Proportion (A_{sq}), for any given square
Open Access	$A_{sqOA} = (\sum l_{ON} + \sum l_{OS}) / (\sum l_{BN} + \sum l_{BS} + \sum l_{ON} + \sum l_{OS} + \sum l_{PN} + \sum l_{PS} + \sum l_{WD})$
Blocked Access	$A_{sqBA} = (\sum l_{BN} + \sum l_{BS}) / (\sum l_{BN} + \sum l_{BS} + \sum l_{ON} + \sum l_{OS} + \sum l_{PN} + \sum l_{PS} + \sum l_{WD})$
Signed Access	$A_{sqSA} = (\sum l_{BS} + \sum l_{OS} + \sum l_{BS}) / (\sum l_{BN} + \sum l_{BS} + \sum l_{ON} + \sum l_{OS} + \sum l_{PN} + \sum l_{PS} + \sum l_{WD})$
Not Blocked and Signed	$A_{sqNBS} = (\sum l_{OS} + \sum l_{PS}) / (\sum l_{BN} + \sum l_{BS} + \sum l_{ON} + \sum l_{OS} + \sum l_{PN} + \sum l_{PS} + \sum l_{WD})$

2.3.1 National Trends

National Trends analysis used data from resurveyed National Trend squares. These data were analysed using R and the glmmTMB package (glmmTMB Team, 2024). Data were zero inflated ratio values hence a beta model was fitted where survey was a fixed integer distinguishing between GMEP and ERAMMP survey data.

glmmTMB(y ~ survey-1 + (1|square identifier), ziformula = ~1, family = "beta_family")

Table 2-4 gives a detailed breakdown of the survey results across surveys and resurveyed squares.

2.3.2 Glastir Impact

Glastir impacts analysis used data from all targeted squares. The historical GMEP data were severely limited, hence it was impossible to identify resurveyed paths or to spatially associate surveyed paths with the options in Section 4 (Appendix 1). Hence no direct path-to-path comparison was possible.

The Glastir extent in-square was used to assess impact, where this extent was the dissolved maximum area inclusively between 2012 and 2015 (Glastir area). The glmmTMB package for R was used, with model expression as follows, where survey was a fixed integer distinguishing between GMEP and ERAMMP:

*glmmTMB(y ~ survey * glastir area + (1|square identifier), ziformula = ~1, data=df_glastir, family="beta_family")*

Table 2-4 gives a detailed breakdown of the survey results across surveys and resurveyed squares.

Table 2-4. Percentage Public Rights of Way by Square for each coded survey class Access related codes for position 1 are; B, Blocked; O, Open; P, Poor. For position 2 are; N, Not Signed; S, Signed and the unique assignment WD, Water Damaged. Results are given for resurveyed squares (Resurveyed), for squares surveyed under ERAMMP and GMEP, split into Glastir targeted squares (Targeted) and to National Trend squares. By Survey summarises all squares surveyed under ERAMMP and GMEP. Bracketed values are 95% confidence intervals and n is sample number. Note there were no Glastir targeted resurveyed squares with PROW data.

Group	BN%	BS%	ON%	OS%	PN%	PS%	WD%	B%	S%
Resurveyed									
National Trend	M=16 [11,22] n=43	M=1 [0,2] n=8	M=27 [20,33] n=60	M=50 [42,57] n=81	M=4.3 [1.8,6.8] n=17	M=2.3 [0,4.7] n=7	n=0	M=17 [12,23] n=47	M=52 [44,60] n=81
GMEP									
Targeted	M=12 [7,17] n=27	M=0.3 [0.1,0.5] n=2	M=14 [8,20] n=23	M=33 [25,42] n=49	M=2.6 [0,5.2] n=5	M=0.5 [-0.2,0.8] n=3	n=0	M=12 [7,17] n=27	M=34 [26,42] n=51
National Trend	M=1.1 [0.6,1.5] n=26	M=0.7 [0,1.3] n=4	M=15 [10,20] n=36	M=39 [31,47] n=60	M=2.4 [0.1,3.8] n=11	M=2.2 [0,4.4] n=7	M=0.1 n=1	M=11 [7,16] n=29	M=41 [33,50] n=60
ERAMMP									
Targeted	M=13 [0,25] n=5	M=0.9 [-0.5,1.3] n=2	M=37 [18,56] n=12	M=43 [22,63] n=12	M=3.6 [-0.1, 6.4] n=3	M=2.3 [-2.6,4.9] n=1	M=0.52 n=1	M=14 [0 4,27] n=7	M=45 [23,66] n=12
National Trend	M=12 [6,17] n=30	M=1.1 [0.2, 2.1] n=9	M=32 [23,40] n=43	M=46 [37,56] n=54	M=7.8 [2.7,13] n=14	M=0.2 n=1	n=0	M=13 [7,18] n=34	M=46 [37, 56] n=54
By Survey									
ERAMMP	M=12 [7,17] n=35	M=1.1 [0.3, 1.9] n=11	M=33 [25,40] n=55	M=46 [37,54] n=66	M=7.0 [2.8,11] n=17	M=0.5 [0.3, 0.8] n=2	M=0.1 n=1	M=13 [8,18] n=41	M=46 [38,55] n=66
GMEP	M=11 [8,15] n=53	M=0.5 [0, 0.9] n=6	M=14 [11,18] n=59	M=36 [31,42] n=109	M=2.5 [1.0,4.0] n=16	M=1.3 [0.2, 2.5] n=10	M=0.1 n=1	M=12 [8,15] n=56	M=38 [32,43] n=111

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4 Appendix 1 List of Options Relating to Public Rights of Way

413 Access - footpaths
414 Access - footpaths (no dogs)
415 Access - bridlepath/cyclepath/disabled
416 Access - bridlepath/cyclepath/disabled (no dogs)
417 Access - dedicate new public rights of way
418 Access - permissive access areas
46a Maintenance of linear permissive access - existing Tir Gofal bridleway
46b Maintenance of linear permissive access - existing Tir Gofal footpath
46c Maintenance of linear permissive access - existing Tir Gofal disabled access
500 Access - footpaths [500 DEFUNCT]
501 Access - footpaths (no dogs) [501 DEFUNCT]
502 Access - bridlepath/cyclepath/disabled [502 DEFUNCT]
503 Access - bridlepath/cyclepath/disabled (no dogs) [503 DEFUNCT]
504 Access - dedicate new public rights of way [504 DEFUNCT]
505 Access - permissive access areas [505 DEFUNCT]
506 Access Bridges
507 Access Gates for Disabled People
508 Boardwalks
509 Boardwalks – handrail supplement
512 Hard Surfacing Footpaths
514 Ladder Stile
515 Step Stile
516 Timber Bridle Gate and Posts
517 Timber Kissing Gate and Posts
518 Wooden Bench Seats – simple bench
519 Wooden Stiles [rebated]
526 Track - New basic - no stone
527 Track - New – stone bought in
528 Track – New - stone won on site
529 Track – Upgrade to basic – stone bought in
530 Track - Upgrade to basic – stone won on site
531 Track - Upgrade to basic – no stone
532 Posts for Signs, Waymarks and Boards

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ERAMMP Programme Office
UKCEH Bangor
Environment Centre Wales
Deiniol Road
Bangor, Gwynedd
LL57 2UW
+ 44 (0)1248 374500
erammp@ceh.ac.uk

www.erammp.cymru

www.erammp.wales