



ERS invertebrate habitat survey of the rivers Afon Ystwyth and Afon Rheidol in Ceredigion

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Summary

Exposed Riverine sediments (ERS) support a large number of specialist invertebrates including many nationally rare and scarce species and some UK Biodiversity Action Plan species.

Previous studies on ERS invertebrates have suggested that the amount of ERS habitat in suitable condition for ERS invertebrates may be seriously limited by a number of factors.

An ERS invertebrate habitat assessment pilot study was undertaken in 2008, which suggested that ERS habitat evaluation has the potential to provide a useful tool in the strategic restoration of ERS on rivers and to guide the conservation of ERS species through monitoring of habitat status.

The aim of the present study was to explore further refinement of the ERS Habitat Assessment form and methodology and its potential use for Common Standards Monitoring (CSM) of ERS in Wales. The habitat assessment method was used to assess a number of ERS on the rivers Ystwyth and Rheidol in Wales and to write a report detailing the results and suitability of the assessment for CSM.

The existing ERS Habitat Assessment Form was used to evaluate 11 deposits at Ty'n-yr-helyg and Rheidol Shingles and Backwaters in February 2010.

The sites surveyed on the Ystwyth and Rheidol generally scored well using the Habitat Assessment form, in keeping with their reputation for ERS invertebrate interest and general lack of damaging factors. However the ERS Habitat Assessment form methodology and analysis requires further refinement to accurately reflect the true ERS invertebrate value of individual deposits and complexes and a number of possible developments are flagged.

Some problems were encountered with the adaptation of the ERS Habitat Assessment form for Common Standards Monitoring and these are discussed.

This ERS Habitat Evaluation form and developing methodology, as originally envisaged, retains the potential to provide a valuable tool in auditing ERS deposits of invertebrate value on rivers for the strategic restoration of ERS on rivers and to guide the conservation of ERS species through monitoring of habitat status.

The specific needs of CCW for a Common Standards Monitoring methodology for ERS invertebrate sites requires further thought and development. It may be that by streamlining the ERS Habitat Assessment Form and refining the habitat features so far identified, it can be developed as a method of meeting the need for CSM for ERS invertebrates.

Further work to develop the ERS Habitat Assessment form and adapt its use to CSM is identified.

Crynodeb

Mae gwaddodion afonol wedi'u datgelu (GAD) yn cynnal nifer fawr o infertebratau arbenigol gan gynnwys llawer o rywogaethau sy'n brin ac anfynych yn genedlaethol a rhai o rywogaethau Cynllun Gweithredu'r DU ar Fioamrywiaeth.

Mae astudiaethau blaenorol o infertebratau GAD wedi awgrymu ei bod yn bosibl bod nifer o ffactorau'n cyfyngu'n ddifrifol ar faint y cynefin hwn sydd mewn cyflwr addas i infertebratau GAD.

Gwnaethpwyd astudiaeth beilot asesu cynefin infertebratau GAD yn 2008. Awgrymodd yr astudiaeth honno fod gan waith gwerthuso'r cynefin hwn y potensial i gynnig offeryn defnyddiol wrth adfer GAD yn strategol ar afonydd ac i arwain gwaith diogelu rhywogaethau GAD trwy fonitro statws y cynefin.

Nod yr astudiaeth hon oedd ymchwilio i fireinio mwy ar y ffurflen a'r fethodoleg Asesu Cynefin GAD a'r posibilrwydd o'i ddefnyddio ar gyfer gwaith Monitro â Safonau Cyffredin ar GAD yng Nghymru. Defnyddiwyd y dull asesu cynefin i asesu nifer o GAD ar afonydd Ystwyth a Rheidol yng Nghymru ac i ysgrifennu adroddiad yn nodi'r canlyniadau ac addasrwydd yr asesiad ar gyfer Monitro â Safonau Cyffredin.

Defnyddiwyd y Ffurflen Asesu Cynefin GAD bresennol i werthuso 11 o ddyddodion yn Nhŷ'n-yr-helyg a Marianau a Merddyfroedd Rheidol ym mis Chwefror 2010.

Yn gyffredinol sgoriodd y safleoedd a arolygwyd ar afonydd Ystwyth a Rheidol yn dda gan ddefnyddio'r Ffurflen Asesu Cynefin, yn unol â'u henw da ar gyfer diddordeb o ran infertebratau GAD a diffyg cyffredinol ffactorau niweidiol. Fodd bynnag, mae angen mireinio mwy ar fethodoleg a dadansoddiad y Ffurflen Asesu Cynefin GAD er mwyn adlewyrchu'n gywir wir werth dyddodion unigol a chymhlygion o ran infertebratau GAD a thynnir sylw at nifer o ddatblygiadau posibl.

Daethpwyd o hyd i rai problemau gydag addasu'r Ffurflen Asesu Cynefin GAD ar gyfer Monitro â Safonau Cyffredin ac mae'r rhain yn cael eu trafod.

Mae gan y ffurflen hon i Werthuso Cynefin GAD a'r fethodoleg sy'n datblygu, fel y'u rhagwelwyd yn wreiddiol, y posibilrwydd o hyd i gynnig offeryn gwerthfawr wrth archwilio dyddodion GAD o werth infertebrataidd ar afonydd ar gyfer adfer GAD yn strategol ar afonydd ac i arwain gwaith diogelu rhywogaethau GAD trwy fonitro statws y cynefin.

Mae angen mwy o waith meddwl a datblygu ar anghenion penodol Cyngor Cefn Gwlad Cymru am fethodoleg Monitro â Safonau Cyffredin ar gyfer safleoedd infertebratau GAD. Efallai y gellir ei ddatblygu'n ffordd o ddiwallu'r angen am Fonitro â Safonau Cyffredin ar gyfer infertebratau GAD, trwy symleiddio'r Ffurflen Asesu Cynefin GAD a mireinio'r nodweddion cynefinol a nodwyd hyd yma.

Nodir rhagor o waith i ddatblygu'r Ffurflen Asesu Cynefin GAD ac addasu'r ffordd o'i defnyddio at Fonitro â Safonau Cyffredin.

1. Introduction

Exposed Riverine sediments (ERS) support a large number of specialist invertebrates including many nationally rare and scarce species and some UK Biodiversity Action Plan species.

Fowles (2005) provides a definition of ERS: *Exposed, within channel, fluvially deposited sediments (sands, gravels and silts) that lack continuous vegetation cover, whose vertical distribution lies between the levels of bankfull and the typical base flow of the river.*

Hewitt *et al.* (2007) provide a broader definition: *Exposed, recently deposited, fluvial sediments (gravels, sands and silts), with or without vegetation cover, on active river systems*, which allows the inclusion of specialist invertebrates requiring fluvially deposited sand on the top of riverbanks.

Previous studies on ERS invertebrates on the River Eden and other catchments (e.g. Bates *et al.* 2007; Hewitt *et al.* 2007) have suggested that the amount of ERS habitat in suitable condition for ERS invertebrates may be seriously limited by a number of factors, including stock access, human trampling and gravel extraction.

An ERS invertebrate habitat assessment pilot study was undertaken to assess the amount of potential ERS habitat on two contrasting rivers in north west England; the River Eden in Cumbria and the River Irwell in Lancashire. The aim was to evaluate the amount of ERS resource in good condition for specialist invertebrates. A draft ERS Habitat Assessment Form was developed and trialled in that study. The main stems of the River Eden and the River Irwell were walked and all ERS deposits of 20m² or more were photographed and recorded on the standard ERS Habitat Assessment Form.

The results of the study were presented by Hewitt and Parker (2009) and concluded that although the methodology required further refinement, nevertheless a study of this kind can provide an indication of the amount, distribution and general quality ERS invertebrate habitat on a river or catchment. As such it was suggested that ERS habitat evaluation has the potential to provide a useful tool in the strategic restoration of ERS on rivers and to guide the conservation of ERS species through monitoring of habitat status. Once refined, the Habitat Condition Scores could be used to evaluate the broad ERS resource on a river, enabling the identification of key deposits and stretches. The Habitat Potential Scores could also be of value in identifying individual or series of deposits in poor condition which could, under suitable management, be improved. This should enable targeting of effort and resources to best effect in enhancing the ERS habitat resource of rivers.

Buglife – The Invertebrate conservation Trust and Countryside Council for Wales (CCW) arranged a small study looking at the assessment of ERS in Wales. The aim of this project was to explore further refinement of the ERS Habitat Assessment form and methodology and its potential use for Common Standards Monitoring (CSM) of ERS in Wales. The habitat assessment method was used to assess a number of ERS sites on the rivers Ystwyth and Rheidol in Wales and to write a report detailing the results and suitability of the assessment for CSM.

2. Methods

Fieldwork took place on 22nd and 23rd February. We met with Adrian Fowles of CCW on the Afon Ystwyth to discuss the existing ERS Habitat Assessment form and CCW's desired outcomes for the study.

Sites chosen by CCW to represent a range of local ERS types were visited at Grogwynion and Ty'n-yr-helyg on the Afon Ystwyth and at Rheidol Shingles and Backwaters on the Afon Rheidol. The Ystwyth at Grogwynion is a fast flowing upland river and the extensive deposits here are predominantly coarse in nature with relatively little fine substrate, resulting in a more limited ERS fauna. The deposit at Ty'n-yr-helyg is lower down the river where flows are less severe and consequently it has a significant fraction of sand deposited. This site supports an important ERS beetle community. Finally, the Rheidol Shingles and Backwaters comprise a series of sand and shingle deposits with braided channels at the lower end of the Afon Rheidol. Figure 1 shows the location of the deposits surveyed on the Afon Rheidol.

The existing ERS Habitat Assessment Form was used to evaluate 11 deposits at Ty'n-yr-helyg and Rheidol Shingles and Backwaters. Notes on the use of the form are given in Appendix 1. Thought was also given to how this might be adapted to CSM use.

3. Results and analysis

The individual Habitat Assessment forms for each ERS deposit are provided in Appendix 2.

Based on data recorded on the Habitat assessment forms, values were calculated by which each deposit could be scored and ranked:

- An area value was given for each deposit: $<100\text{m}^2=1$; $100\text{-}1000\text{ m}^2=2$; $1000\text{-}10000\text{ m}^2=3$; $10000+\text{ m}^2=4$
- A topography value of 1, 2 or 3 was allocated according to whether the deposit was flat (1), humped (2) or complex (3). An additional point is given for the presence of a backwater channel
- A habitat diversity score was calculated from the number of ERS micro-habitats, of 10m^2 or more, recorded on the deposit. An exception was made in the case of water seeping through ERS, where presence of 3m^2 or more was awarded a point.
- A habitat connectivity score was calculated from the proximity of the nearest ERS deposits: 2 other deposits within $100\text{m}=3$; 2 other deposits within $500\text{m}=2$; 2 other deposits within $1000\text{m}=1$; one or no deposits with $1000\text{m}=0$.

A Habitat Potential Score (HPS) for each deposit was calculated by summing the above four values.

A similar set of values to assess the impact of various detrimental factors were also calculated using the criteria set out in the notes on the recording form (appendix 1) - stock trampling and dunging, development of stabilising vegetation cover, human trampling, vehicular compaction, gravel extraction, siltation, erosion, shading and other detrimental impacts. These were then summed to give an Environmental Impact Score (EIS). The EIS was then subtracted from the HPS to give a Habitat Condition Score (HCS) which provides a crude indication of the condition of each deposit for ERS invertebrates.

Tables 1 and 2 present the 11 ERS deposits surveyed, ranked by HPS and HCS respectively.

Figure 1.

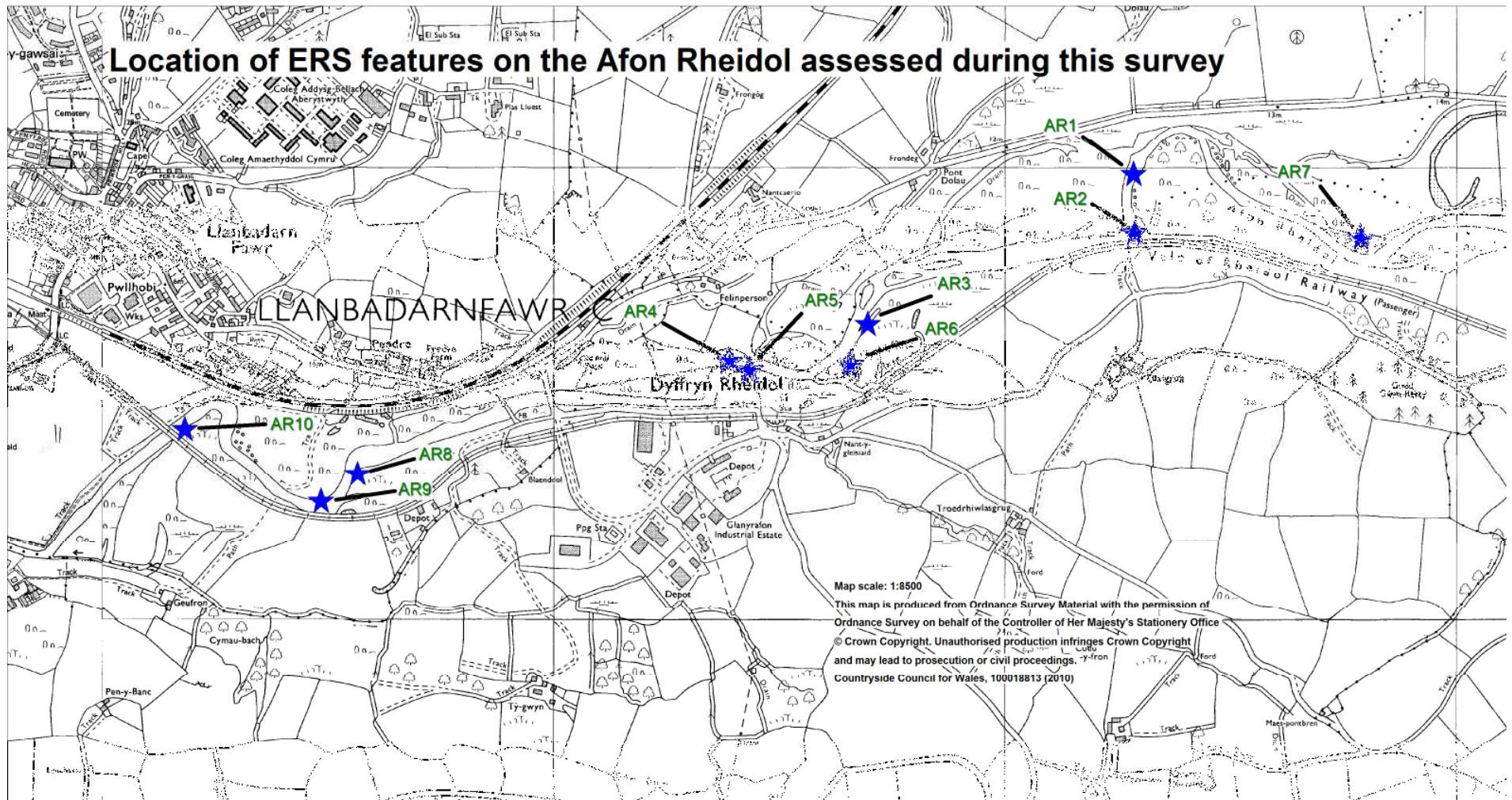


Table 1. ERS deposits ranked by ERS invertebrate potential

	Site Code	Area	Area score	topography score	habitat diversity score	habitat connectivity score	ERS invert. Potential score	stock impact	stabilising vegetation cover	pedestrian impact	vehicle impact	gravel extraction impact	siltation	eroding	shading	other impact	impact score	ERS condition
Rheidol Shingles & Backwaters	AR1	3200	3	4	9	3	17		1								1	16
Rheidol Shingles & Backwaters	AR6	1200	3	2	7	3	15		2						1		3	12
Rheidol Shingles & Backwaters	AR3	1000	3	2	6	3	14		2								2	12
Rheidol Shingles & Backwaters	AR8	800	2	3	6	3	14								1		1	13
Rheidol Shingles & Backwaters	AR9	500	2	4	4	3	13		1						1		2	12
Rheidol Shingles & Backwaters	AR10	1800	3	3	4	3	13		1	8							9	4
Rheidol Shingles & Backwaters	AR5	190	2	3	4	3	12		1								1	11
Rheidol Shingles & Backwaters	AR2	360	2	2	5	3	12		1								1	11
Ty'n-yr-helyg SSSI	AY1	520	2	2	5	2	11		1								1	10
Rheidol Shingles & Backwaters	AR7	2650	3	2	4	2	11		1						1		2	9
Rheidol Shingles & Backwaters	AR4	180	2	2	4	3	11		1								1	10

Table 2. ERS deposits ranked by ERS invertebrate condition

	Site Code	Area	Area score	topography score	habitat diversity score	habitat connectivity score	ERS invert. Potential score	stock impact	stabilising vegetation cover	pedestrian impact	vehicle impact	gravel extraction impact	siltation	eroding	shading	other impact	impact score	ERS condition
Rheidol Shingles & Backwaters	AR1	3200	3	4	9	3	17		1								1	16
Rheidol Shingles & Backwaters	AR8	800	2	3	6	3	14								1		1	13
Rheidol Shingles & Backwaters	AR6	1200	3	2	7	3	15		2						1		3	12
Rheidol Shingles & Backwaters	AR3	1000	3	2	6	3	14		2								2	12
Rheidol Shingles & Backwaters	AR9	500	2	4	4	3	13		1						1		2	12
Rheidol Shingles & Backwaters	AR5	190	2	3	4	3	12		1								1	11
Rheidol Shingles & Backwaters	AR2	360	2	2	5	3	12		1								1	11
Ty'n-yr-helyg SSSI	AY1	520	2	2	5	2	11		1								1	10
Rheidol Shingles & Backwaters	AR4	180	2	2	4	3	11		1								1	10
Rheidol Shingles & Backwaters	AR7	2650	3	2	4	2	11		1						1		2	9
Rheidol Shingles & Backwaters	AR10	1800	3	3	4	3	13		1	8							9	4

4. Discussion

Features of the sites visited in this study

Ty'n-yr-helyg on the Ystwyth was designated a SSSI for its exceptional ERS invertebrate interest some 20 years ago. Adrian Fowles considers that this site remains essentially unchanged in 2010. However this methodology does not identify the site as being of exceptional value to ERS invertebrates. Apparently some important factors are being overlooked in this instance. There are several candidates. It could be the aspect and sheltered nature of the site. It may be some particularly valuable quality of the sand/shingle quality and mix. The degree of scattered seasonal vegetation may be significant. Alternatively, or additionally, it could be the longevity of this deposit in its present form that is special. Although ERS is a naturally, and even essentially, dynamic habitat, necessarily going through cyclic successional stages it may be that deposits that, through a rare combination of natural factors, retain a stable state within this succession are able to develop an important ERS community.

The Rheidol Shingles comprised a range of deposits of varied interest to ERS invertebrates and included the highest scoring deposit in this study, using the described methodology. The close proximity of the Rheidol deposits resulted in them each scoring highly for habitat connectivity. Serial ERS deposits in close proximity are very important to ERS invertebrate populations, allowing a range of different successional stages of ERS deposit to be present within the range of an individual population and therefore allowing a number of species with various specific habitat requirements to be supported. The Rheidol Shingles and Backwaters look to be a prime example of the enhanced value to ERS invertebrates of such meta-sites and the ERS value of the Rheidol meta-site can be expected to exceed the highest score of any individual deposit within the site.

Compaction and disturbance of the substrate through trampling is perhaps the single most significant detrimental impact on ERS invertebrates on many rivers. On the Ystwyth and Rheidol sites visited the lack of trampling was significantly absent on all but one of the deposits visited.

Issues with the ERS Habitat Assessment Form and methodology

The timing of any single ERS habitat assessment study will have an impact on the results. In this case, circumstances led us to conduct the assessments in late winter. At this season, the deposits, washed clear of dead plant material and freshly re-graded by winter flood events, were looking their best. Thus Habitat Potential scores will have been at their highest. Conversely, seasonal vegetation cover is difficult to assess and with much stock inside for the winter, human visitor pressure at its lowest and any extraction activities largely masked by re-grading of the sediments by recent spates, detrimental impacts affecting the deposits may have been under-estimated. Steps were taken to take these factors into account in the assessments, with stock impact being measured on the adjacent land use and effectiveness of fencing protecting the ERS deposits, proximity and popularity of public footpaths etc. Nonetheless, a study at a different time of year may well have produced different results. The use of the Habitat Assessment Form may need to be adjusted to accommodate conditions at different times of year.

Detrimental Impact Scores remain a subjective evaluation of relative impact of various factors on a deposit overall. A better way to do this would be to give 4 points for each habitat feature present and then score detrimental impact on each feature from 0-3.

Further refinement of the ERS Habitat Assessment Form is required. The ERS habitat features have been developed from the original form but more work is needed on this. Weighting of the habitat scores to reflect the greater value to ERS invertebrates of some habitats should be experimented with.

Use of ERS Habitat Assessment Form for Common Standards Monitoring

The ERS Habitat Assessment form was designed to provide a quick audit of a river or catchment. In the course of discussions with Adrian Fowles, it became apparent that CCW's requirement for Common Standards Monitoring methodology is somewhat different to the catchment-wide audit of ERS as originally envisaged and so far developed. Much of the general information collected on the front of the Form is considered unnecessary and time consuming for CSM. Doubt was expressed over the value and accuracy of assessing detrimental impacts for CSM purposes, although we consider this methodology has potential to be of real value in catchment audit uses. The suggestion was made that if a suitable description of how to recognise ERS habitat features in good condition could be devised, then assessment of what are often sporadic and ephemeral impacts need not be immediately considered. We remain to be convinced of the practicality of recognising and describing good condition in a habitat that can change radically with a single flood event and consider that some form of assessment of detrimental impacts based on evidence other than just immediate substrate condition may be the most effective way of assessing the status of a site.

There is scope for simplifying and stream-lining the front of the Form in particular. Specifically, the attempted mapping of area and position of habitat features on a plan of the deposit is rightly considered laborious, difficult to standardise across surveyors and, in such a dynamic habitat, unlikely to be representative after the next flood event.

In its present form it is not immediately suitable for CSM desired by CCW. However the ERS habitat features presently identified on the form do provide a basis on which a Common Standards Monitoring methodology could be developed. Boulders on gravel/shingle has been added as a habitat feature on the suggestion of Adrian Fowles. The presence of suitable winter refugia has also been added as a feature following our site visit with Adrian. The ERS invertebrate habitat features can be further developed. For example there is some evidence that scattered plants are an important asset on a deposit and this feature should perhaps be identified explicitly on both sand and shingle substrates. The amount and openness of fine substrates are of known importance to ERS invertebrates, hence the severe impact of any form of compaction by trampling, tracking, etc. A method of evaluating the openness of the substrate could improve habitat assessment methodology. Further thought will be given to developing the Assessment Form along these lines.

That said looking for fixed habitat features for monitoring purposes in a dynamic environment such as ERS is bound to be problematic. To counter this to some extent one might require say five deposits within a given stretch of river to meet the required number

of habitat features in order for the meta-site as a whole to meet favourable condition status in CSM.

Other features that could be significant to ERS invertebrates include the aspect of the deposit, how sheltered it is – making it both warmer and more humid and the distribution of optimal habitats for rare species up the deposit, maintaining their availability across a range of river flow levels.

Additionally, geology, altitude, flow velocity, climate etc are all general environmental factors affecting ERS invertebrates that would need to be considered if comparing sites between catchments or even across different reaches of a single river.

Site continuity may also play a role in the high interest of sites such as Ty'n-yr-helyg and this may need to be factored in where appropriate.

Further thought will be given to developing the Assessment Form along these lines.

5. Conclusion

The Habitat Assessment methodology and analysis remain crude and further work is yet required to refine them, possibly by weighting scores for different attributes and impacts to better reflect the differing levels of importance on ERS invertebrate communities.

This ERS Habitat Evaluation form and developing methodology, as originally envisaged, retains the potential to provide a valuable tool in auditing ERS deposits of invertebrate value on rivers for the strategic restoration of ERS on rivers and to guide the conservation of ERS species through monitoring of habitat status.

The specific needs of CCW for a Common Standards Monitoring methodology for ERS invertebrate sites requires further thought and development. It may be that by streamlining the ERS Habitat Assessment Form and refining the habitat features so far identified, it can be developed as a method of meeting the need for CSM for ERS invertebrates.

6. Further Work

In the light of the experience gained in this survey, revisit some of the best Cumbrian sites and further consider the environmental and physical factors that they share with good ERS in Wales and elsewhere whilst setting them apart in a Cumbrian context.

Refine the list of ERS invertebrate habitat features and experiment with weighting of their scores in line with number of ERS specialist invertebrates associated with each feature and the national rarity of those species.

Develop an ERS Habitat Assessment Handbook through refinement of present methodology, ground-truthing and consultation with experts. This would include description of habitat features to aid identification in the field and for use in CSM

7. Acknowledgements

This study was commissioned by Buglife – the Invertebrate Conservation Trust and was funded by CCW and Buglife. We are grateful to Adrian Fowles of CCW for valuable comments on the ERS Habitat Assessment Form, stimulating discussion on ERS habitat in the field and comments on the report.

8. References

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- Fowles, A.P. (2005) *Specialist Coleoptera of exposed riverine sediments (ERS)* (version: 8 May 2003, updated 23 April 2004). <http://thasos.users.btopenworld.com/ersqi.htm>.
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Appendix 1 Notes on recording form:

Definition of ERS

Exposed riverine sediments are recently accreted, fluvially deposited sediments that are exposed above water level. They may be vegetated or unvegetated.

Type of ERS included in this survey

ERS deposits include both in-channel shoals of sand/gravel/cobbles and riverbank deposits, usually of sand. Only in-channel deposits are included in this survey.

Sediment grades:

Silt	1/256 – 1/16mm
Sand	1/16 – 2mm
Gravel	2 – 10mm
Shingle	10 – 64mm
Cobble	64 – 256mm
Boulder	>256mm

Size threshold of deposit

A minimum area of 10m² is required for a deposit to be included in this survey

Microhabitats

These are mutually exclusive. Do not record any part of the deposit as more than one microhabitat.

Grading environmental impacts

The assessment of degree of impact is bound to be subjective. Take photographs of incidents to allow calibration of scores at a later date.

Stock access – Trampling/dunging/grazing measured by degree of poaching, grazing or dung. If stock not present (or recent flooding has removed signs) assess potential impact by state of fencing and physical access to the ERS. Thus 0 would indicate adjacent land not used for grazing or ERS protected by stock proof fencing;

1 = limited access <10 animals

2 = good access; 11-33 animals

3 = open access >33 animals

At some sites dunging may be by high numbers of ducks or geese usually sustained by supplementary feeding in urban areas or in reared birds put down for shooting.

Stabilising vegetation cover. This measures how much of the deposit has stabilised and effectively developed beyond the stages useful to ERS specialised species. Grade by % of microhabitat stabilised by permanent vegetation cover. 0=none; 1=<25%; 2=26-50%; 3=>50%.

Other trampling. humans or waterfowl impacts etc., trampling by stock will be assessed through dung/grazing assessment. Measure human trampling by visual signs and also public access, proximity to footpath and distance from parking, residential areas (large or small) 0= no significant human access, 1= no open access but some impact from limited numbers e.g. anglers, 2= public access receives moderate trampling but ERS is some

distance from housing/road/public parking requiring a significant walk to reach it, 3= easy public access and heavily used.

Vehicle tracking. This can be an issue where deposits are driven over to ford the river, where vehicles are crossing the deposits to shingle extraction sites, or for leisure use such as vehicular access to anglers. 1=<10% shoal affected (assessed through evidence of tyre tracks or access/compaction caused by vehicles), 2=11-33%; 3=>33%

Shingle extraction. Signs of digging, bulldozing, vehicle tracking and vehicle access onto ERS1=<10% shoal removed, 2=11-33% removed; 3=>33%

Siltation. Clogging of the substrate by silt or algae can be caused by erosion of the riverbanks upstream (e.g. through stock poaching) or enrichment of the river (through runoff of fertilisers etc). Score by area of microhabitat affected

- 0 = none
- 1 = A thin layer of silt of a thickness that its depth doesn't cover the substrate fully and of an area <50% of the deposit
- 1 = A thick silt layer of a thickness that its depth covers the substrate fully and covers an area <25% of the deposit
- 2 = A thin layer of silt at a thickness that the depth doesn't cover the substrate fully and area covers >50% of the deposit
- 2 = A thick silt layer of a thickness that its depth covers the substrate fully and the area cover 26-50% of the deposit
- 3 = A thick layer of silt covering >50% of the existing substrate

Eroding. Erosion is a natural process of renewal of ERS but at this stage the deposits are of more limited value to ERS specialist species as loose, open surface substrate is removed, leaving more compacted layers exposed. Score by area of compaction caused by erosion 0=None, 1=<10% shoal affected, 2=11-33%; 3=>33%

Shading. Shade from the canopy is generally detrimental to ERS invertebrates, sand under trees being a notable exception for craneflies of the genus *Nephrotoma* in particular. Score by area of habitat feature shaded by trees (not scattered plants or seasonal vegetation which can be beneficial) 0=None, 1=<20%, 2=21-60%, 3=>60%.

Appendix 2: record forms for each deposit

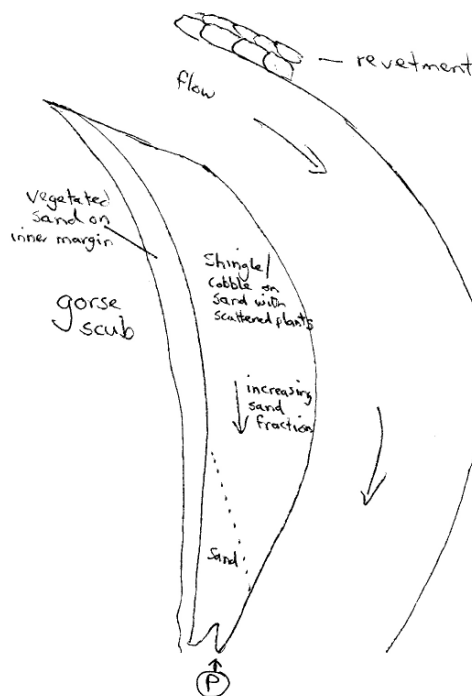
ERS Habitat Assessment Form
features present are shaded yellow


Site Name Ty'n-yr-helyg, Llanfarian		Site Code AY1	
		River Afon Ystwyth	
Landowner/ Tenant (if known)		Grid Ref SN59557656	
		Surveyor SMH/JP	
Area of Deposit 520 m ²	Stream width	Survey Date 22 Feb 2010	
Deposit Type Point Bar Lateral Bar Island Fan Braided Channel Old Channel			
Substrate type(s) Silt Sand Gravel Shingle Cobble Boulder			
Deposit Topography Humped Complex Flat Backwater channel			
Vegetation Predominantly bare 15 % Scattered 80 % Established 5 %			
Distance to nearest ERS deposit (m) Upstream ? Downstream 50			
% shade from canopy		Adjacent land use scrub	
Alien plants: species/ percentage ground cover		River engineering YES/NO	

Brief description of the site:

Simple, humped point bar of shingle (dominant), cobbles (frequent) and sand (frequent) with occasional boulders. Scattered plants throughout with sand fraction becoming dominant towards the toe of the deposit.

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



				Environmental factors scale of 0-3 (zero-minor-moderate-major)									
				Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:
													
ERS Invertebrate habitat features													
Stony water's edge (<1m zone)				85									
Sandy/silty water's edge (<1m zone)				5									
Shingle slope/top bare/sparsely vegetated				350									
Sand or sand/shingle on top of bar bare/sparsely vegetated				50		1							
Water seeping through ERS													
Sand deposits beneath trees													
Boulders with gravel matrix													
Cobbles				30									
Remnant pools on open shingle													
Damp sand													
Damp shingle													
Boulders on gravel/shingle													
Winter refugia terrestrial habitat (e.g. scrub)				Yes									
Area score	2	Habitat feature score		5	1								
Topography score	2	Connectivity score		2	Damaging impact score								1
Habitat Potential Score		11			Habitat Condition Score								10

ERS Habitat Assessment Form

features present are shaded yellow

Site Name	Rheidol Shingles and Backwaters	Site Code	AR1
Landowner/ Tenant (if known)		River	Afon Rheidol
		Grid Ref	SN62308101
		Surveyor	SMH/JP

Area of Deposit	3,200m ²	Stream width		Survey Date	23 Feb 2010
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Deposit Type	Point Bar	Lateral Bar	Island	Fan	Braided Channel	Old Channel
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Substrate type(s)	Silt	Sand	Gravel	Shingle	Cobble	Boulder
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Deposit Topography	Humped	Complex	Flat	Backwater channel
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Vegetation	Predominantly bare	75 %	Scattered	20 %	Established	5 %
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Distance to nearest ERS deposit (m)	Upstream	?	Downstream	5
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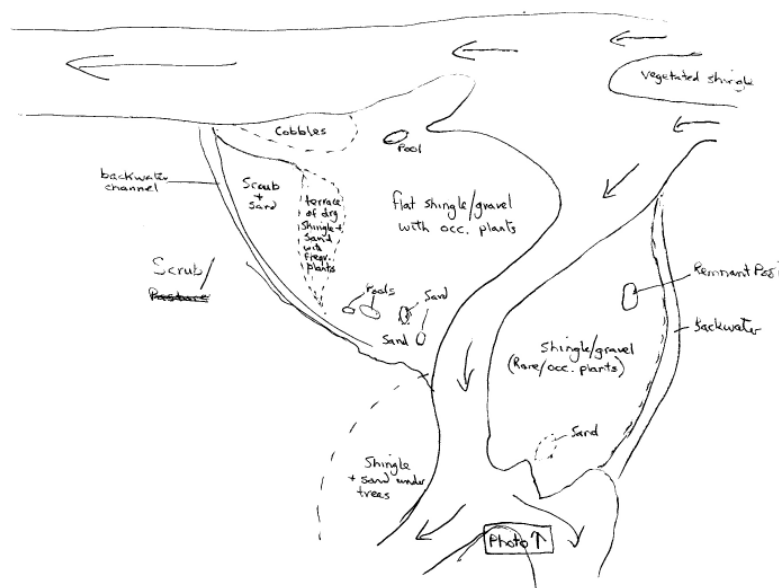
% shade from canopy	5	Adjacent land use	Unused? scrub/grassland
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Alien plants: species/ percentage ground cover		River engineering	YES/NO
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Brief description of the site:

Extensive complex deposit of shingle with areas of sand and cobbles. Bisected by a stream channel there are also remnant pools and backwater channel. A higher terrace of more established ERS has areas of dry sand and scattered plants with scrub developing. Damp sand occurs at the toe of the deposits and sand and shingle under trees is also present

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



				Environmental factors scale of 0-3 (zero-minor-moderate-major)									
				Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:
ERS Invertebrate habitat features													
Stony water's edge (<1m zone)				170									
Sandy/silty water's edge (<1m zone)				8									
Shingle slope/top bare/sparsely vegetated				2,800									
Sand or sand/shingle on top of bar bare/sparsely vegetated				160		1							
Water seeping through ERS				5									
Sand deposits beneath trees				60									
Boulders with gravel matrix													
Cobbles				70									
Remnant pools on open shingle													
Damp sand				15									
Damp shingle				15									
Boulders on gravel/shingle													
Winter refugia terrestrial habitat (e.g. scrub)				Yes									
Area score	3	Habitat feature score		9	1								
Topography score	4	Connectivity score		3	Damaging impact score								1
Habitat Potential Score		17			Habitat Condition Score								16

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features present are shaded yellow

Site Name	Rheidol Shingles and Backwaters	River	Afon Rheidol
Landowner/ Tenant (if known)		Grid Ref	SN62278085
		Surveyor	SMH/JP

Area of Deposit	360 m ²	Stream width	4 m	Survey Date	23 Feb 2010
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Deposit Type	Point Bar	Lateral Bar	Island	Fan	Braided Channel	Old Channel
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Substrate type(s)	Silt	Sand	Gravel	Shingle	Cobble	Boulder
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Deposit Topography	Humped	Complex	Flat	Backwater channel
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Vegetation	Predominantly bare	95 %	Scattered	5 %	Established	%
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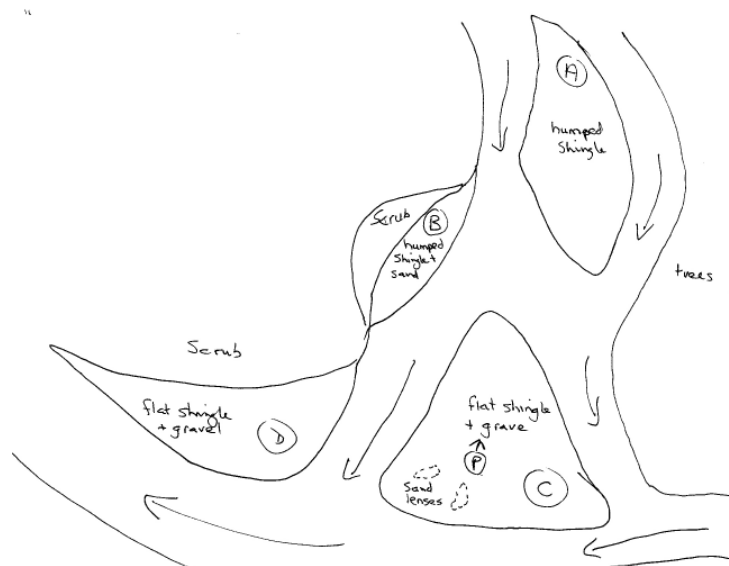
Distance to nearest ERS deposit (m)	Upstream	5	Downstream	
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% shade from canopy	5	Adjacent land use	Unused? scrub/grassland
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Alien plants: species/ percentage ground cover		River engineering	YES/NO
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Brief description of the site:
Series of four shingle/sand deposits among braided stream. The two upper deposits (A & B) are humped, whilst the lower two (C & D) are flatter in profile. Deposit B has a good gradient of shingle and sand up the bank with some scattered vegetation on the crest.

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



			Environmental factors scale of 0-3 (zero-minor-moderate-major)									
			Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:
Invertebrate micro-habitats												
Stony water's edge (<1m zone)			120									
Sandy/silty water's edge (<1m zone)			4							1		
Shingle slope/top bare/sparsely vegetated			230									
Sand or sand/shingle on top of bar bare/sparsely vegetated			8									
Water seeping through ERS			3							2		
Sand deposits beneath trees												
Boulders with gravel matrix												
Cobbles												
Remnant pools on open shingle												
Damp sand												
Damp shingle												
Boulders on gravel/shingle												
Winter refugia terrestrial habitat (e.g. scrub)			Yes									
Area score	2	Habitat feature score		5							1	
Topography score	2	Connectivity score		3	Damaging impact score							1
Habitat Potential Score		12			Habitat Condition Score							11

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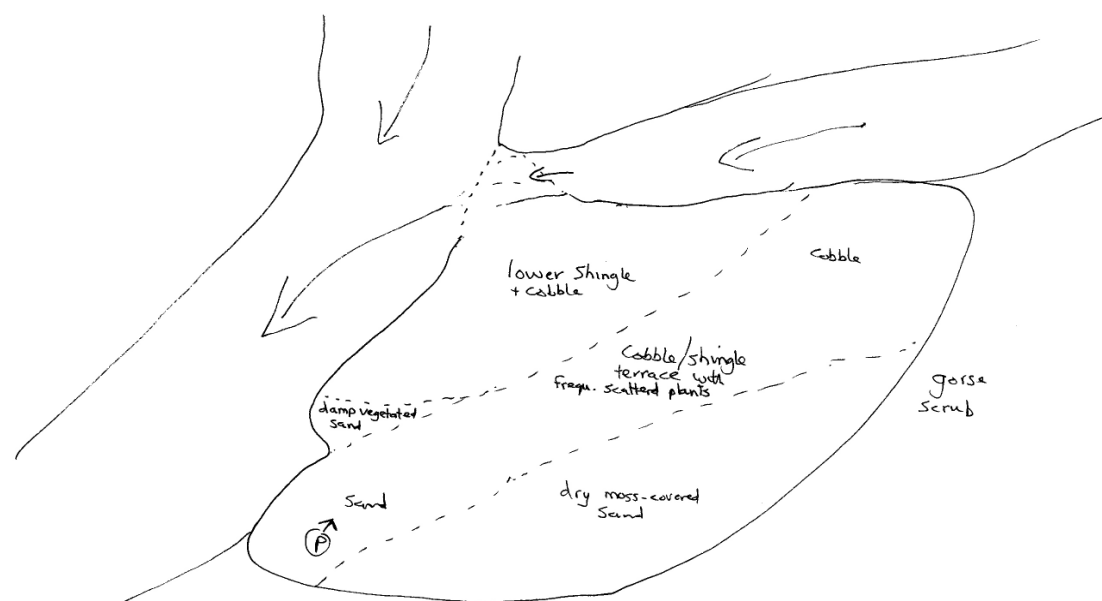
features present are shaded yellow


Site Name	Rheidol Shingles and Backwaters			Site Code	AR3		
Landowner/ Tenant (if known)				River	Afon Rheidol		
				Grid Ref	SN61648067		
				Surveyor	SMH/JP		
Area of Deposit	1000 m ²	Stream width	8 m	Survey Date	23 Feb 2010		
Deposit Type	Point Bar	Lateral Bar	Island	Fan	Braided Channel	Old Channel	
Substrate type(s)	Silt	Sand	Gravel	Shingle	Cobble	Boulder	
Deposit Topography	Humped		Complex	Flat	Backwater channel		
Vegetation	Predominantly bare	50 %	Scattered	5 %	Established	45 %	
Distance to nearest ERS deposit (m)	Upstream			Downstream			
% shade from canopy			Adjacent land use	Unused? scrub/grassland			
Alien plants: species/ percentage ground cover			River engineering	YES/NO			

Brief description of the site:

Terraced cobble/shingle on gravel with dry sand on the top of the terrace and at the toe.
50% of the upper terrace with moss cover and scattered plants cover 70% of this area.

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



	Environmental factors scale of 0-3 (zero-minor-moderate-major)											
	Area	Dunging/grazing	Successional vegetation	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:	other:	
ERS Invertebrate habitat features												
Stony water's edge (<1m zone)	65											
Sandy/silty water's edge (<1m zone)	2											
Shingle slope/top bare/sparsely vegetated	600		1									
Sand or sand/shingle on top of bar bare/sparsely vegetated	300		3									
Water seeping through ERS												
Sand deposits beneath trees												
Boulders with gravel matrix												
Cobbles												
Remnant pools on open shingle												
Damp sand	18											
Damp shingle	20		1									
Boulders on gravel/shingle												
Winter refugia terrestrial habitat (e.g. scrub)	Yes											
Area score	3	Habitat feature score		6		2						
Topography score	2	Connectivity score		3	Damaging impact score							2
Habitat Potential Score	14	Habitat Condition Score							12			

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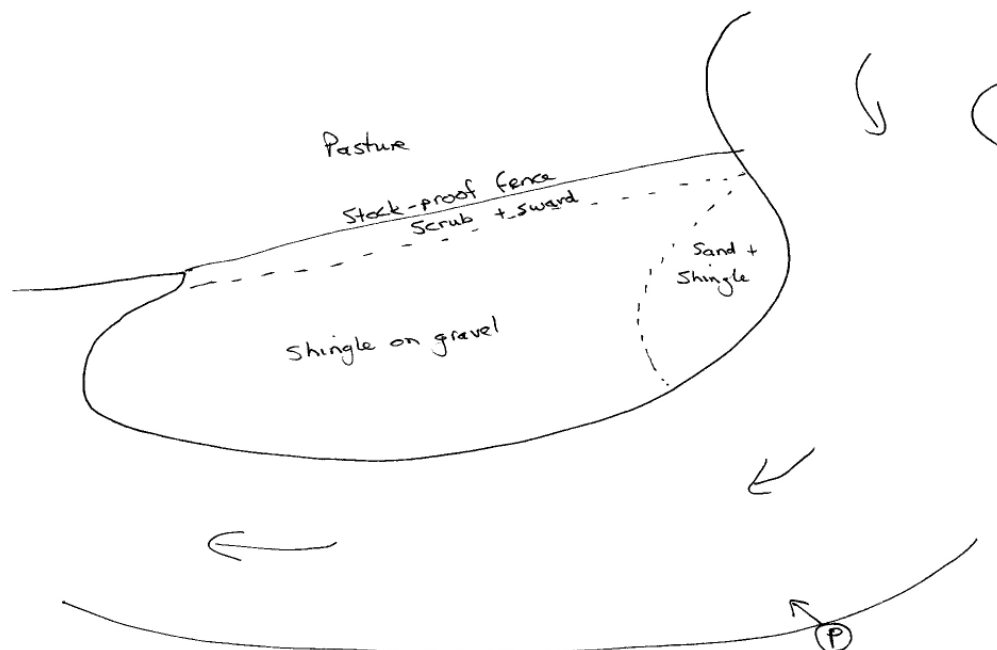
features present are shaded yellow


Site Name <i>Rheidol Shingles and Backwaters</i>				Site Code <i>AR4</i>	
Landowner/ Tenant (if known)				River <i>Afon Rheidol</i>	
Grid Ref <i>SN61438056</i>				Surveyor <i>SMH/JP</i>	
Area of Deposit <i>180 m²</i>		Stream width <i>5 m</i>		Survey Date <i>23 Feb 2010</i>	
Deposit Type <i>Point Bar</i> Lateral Bar Island Fan Braided Channel Old Channel					
Substrate type(s) Silt <i>Sand</i> <i>Gravel</i> <i>Shingle</i> Cobble Boulder					
Deposit Topography <i>Humped</i> Complex Flat Backwater channel					
Vegetation Predominantly bare 90 % Scattered 2 % Established 8 %					
Distance to nearest ERS deposit (m) Upstream 5 Downstream					
% shade from canopy			Adjacent land use <i>pasture</i>		
Alien plants: species/ percentage ground cover			River engineering YES/NO		

Brief description of the site:

Humped shingle/sand point bar. Sand accreting at head of the bar.

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



				Environmental factors scale of 0-3 (zero-minor-moderate-major)									
			Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:	other:
Invertebrate micro-habitats													
Stony water's edge (<1m zone)			30										
Sandy/silty water's edge (<1m zone)			8										
Shingle slope/top bare/sparsely vegetated			130										
Sand or sand/shingle on top of bar bare/sparsely vegetated			18		1								
Water seeping through ERS													
Sand deposits beneath trees													
Boulders with gravel matrix													
Cobbles													
Remnant pools on open shingle													
Damp sand													
Damp shingle													
Boulders on gravel/shingle													
Winter refugia terrestrial habitat (e.g. scrub)			Yes										
Area score	2	Habitat feature score		4		1							
Topography score	2	Connectivity score		3	Damaging impact score							1	
Habitat Potential Score		11			Habitat Condition Score							10	

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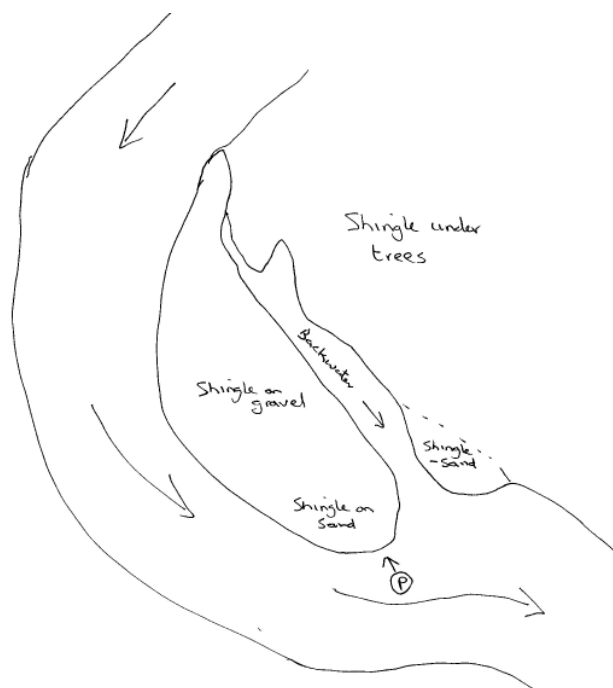
features present are shaded yellow


Site Name <i>Rheidol Shingles and Backwaters</i>				Site Code <i>AR5</i>	
Landowner/ Tenant (if known)				River <i>Afon Rheidol</i>	
Grid Ref <i>SN61458059</i>				Surveyor <i>SMH/JP</i>	
Area of Deposit	<i>190 m²</i>	Stream width	<i>5 m</i>	Survey Date	<i>23 Feb 2010</i>
Deposit Type	Point Bar	Lateral Bar	Island	Fan	Braided Channel
Substrate type(s)	Silt	Sand	Gravel	Shingle	Cobble
Deposit Topography	Humped	Complex	Flat	Backwater channel	
Vegetation	Predominantly bare	98 %	Scattered	%	Established
Distance to nearest ERS deposit (m)	Upstream		Downstream	5	
% shade from canopy	5	Adjacent land use <i>woodland</i>			
Alien plants: species/ percentage ground cover		River engineering YES/NO			

Brief description of the site:

*Humped shingle/gravel lateral bar with very little vegetation and backwater channel.
The adjacent woodland has extensive shingle deposits beneath the trees.*

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



				Environmental factors scale of 0-3 (zero-minor-moderate-major)									
			Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:	other:
Invertebrate micro-habitats													
Stony water's edge (<1m zone)			65							1			
Sandy/silty water's edge (<1m zone)													
Shingle slope/top bare/sparsely vegetated			120										
Sand or sand/shingle on top of bar bare/sparsely vegetated			5										
Water seeping through ERS													
Sand deposits beneath trees													
Boulders with gravel matrix													
Cobbles													
Remnant pools on open shingle													
Damp sand													
Damp shingle			20										
Boulders on gravel/shingle													
Winter refugia terrestrial habitat (e.g. scrub)			Yes										
Area score	2	Habitat feature score		4							1		
Topography score	3	Connectivity score		3	Damaging impact score							1	
Habitat Potential Score		12			Habitat Condition Score							11	

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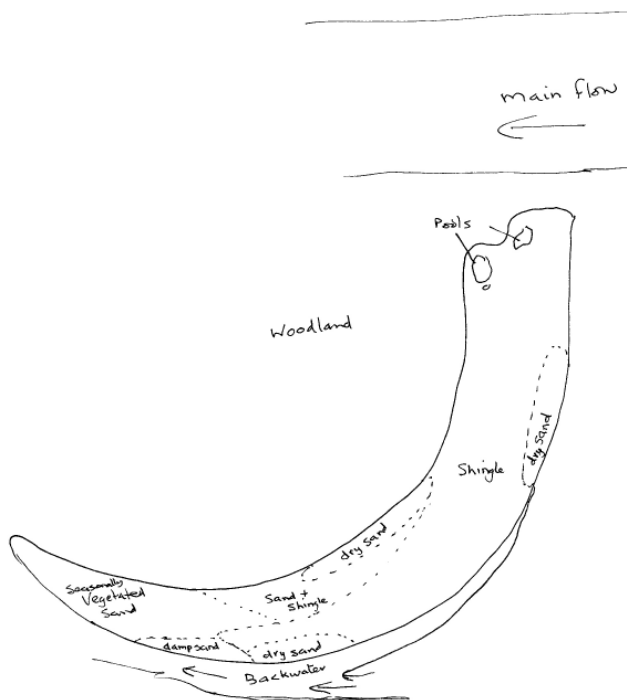
features present are shaded yellow


Site Name	Rheidol Shingles and Backwaters			Site Code	AR6		
Landowner/ Tenant (if known)				River	Afon Rheidol		
Grid Ref	SN61598058			Surveyor	SMH/JP		
Area of Deposit	1,200 m ²	Stream width	5 m	Survey Date	23 Feb 2010		
Deposit Type	Point Bar	Lateral Bar	Island	Fan	Braided Channel	Old Channel	
Substrate type(s)	Silt	Sand	Gravel	Shingle	Cobble	Boulder	
Deposit Topography	Humped	Complex	Flat	Backwater channel			
Vegetation	Predominantly bare	50 %	Scattered	30 %	Established	20 %	
Distance to nearest ERS deposit (m)	Upstream	10	Downstream	100			
% shade from canopy	5	Adjacent land use	woodland				
Alien plants: species/ percentage ground cover	50% Balsam		River engineering	YES/NO			

Brief description of the site:

100m long old channel with open shingle grading to gravel and sand in lower half. Sand is extensively seasonally vegetated. Deposits of damp sand in and around a backwater channel looks good for ERS Diptera

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



		Environmental factors scale of 0-3 (zero-minor-moderate-major)										
	Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:	other:	
Invertebrate micro-habitats												
Stony water's edge (<1m zone)												
Sandy/silty water's edge (<1m zone)		100										
Shingle slope/top bare/sparsely vegetated		500	1									
Sand or sand/shingle on top of bar bare/sparsely vegetated		550	2									
Water seeping through ERS												
Sand deposits beneath trees												
Boulders with gravel matrix												
Cobbles												
Remnant pools on open shingle		10							2			
Damp sand		40										
Damp shingle		20										
Boulders on gravel/shingle												
Winter refugia terrestrial habitat (e.g. scrub)		Yes										
Area score	3	Habitat feature score		7	2					1		
Topography score	2	Connectivity score		3	Damaging Impact Score						3	
Habitat Potential Score		15			Habitat Condition Score						12	

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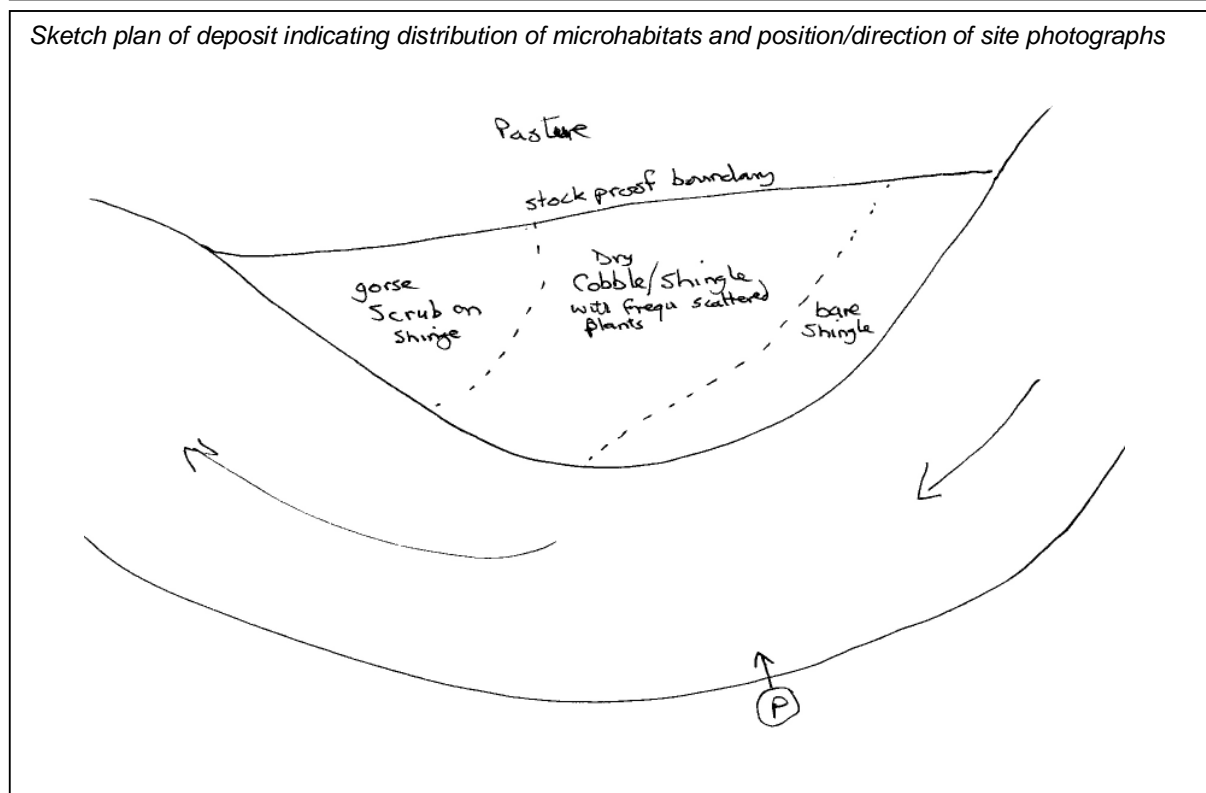
features present are shaded yellow


Site Name <i>Rheidol Shingles and Backwaters</i>				Site Code <i>AR7</i>	
Landowner/ Tenant (if known)				River <i>Afon Rheidol</i>	
Grid Ref <i>SN62788080</i>				Surveyor <i>SMH/JP</i>	
Area of Deposit <i>2,650 m²</i>		Stream width <i>5 m</i>		Survey Date <i>23 Feb 2010</i>	
Deposit Type	Point Bar	Lateral Bar	Island	Fan	Braided Channel
Substrate type(s)	Silt	Sand	Gravel	Shingle	Cobble
Deposit Topography	Humped	Complex	Flat	Backwater channel	
Vegetation	Predominantly bare	20 %	Scattered	50 %	Established
Distance to nearest ERS deposit (m)	Upstream		Downstream	350	
% shade from canopy	30	Adjacent land use <i>pasture</i>			
Alien plants:				River engineering <i>YES/NO</i>	

Brief description of the site:

Large, open, gently humped, coarse shingle and cobble. Scattered gorse becoming more established scrub in lower inner third of the deposit. Surveyed from across river

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



				Environmental factors scale of 0-3 (zero-minor-moderate-major)										
				Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:	other:
														
Invertebrate micro-habitats														
Stony water's edge (<1m zone)				150										
Sandy/silty water's edge (<1m zone)														
Shingle slope/top bare/sparsely vegetated				1000										
Sand or sand/shingle on top of bar bare/sparsely vegetated														
Water seeping through ERS														
Sand deposits beneath trees														
Boulders with gravel matrix														
Cobbles				1500		1						2		
Remnant pools on open shingle														
Damp sand														
Damp shingle														
Boulders on gravel/shingle														
Winter refugia terrestrial habitat (e.g. scrub)				Yes										
Area score		3	Habitat feature score		4	1						1		
Topography score		2	Connectivity score		2	Damaging impact score								2
Habitat Potential Score				11		Habitat Condition Score								9

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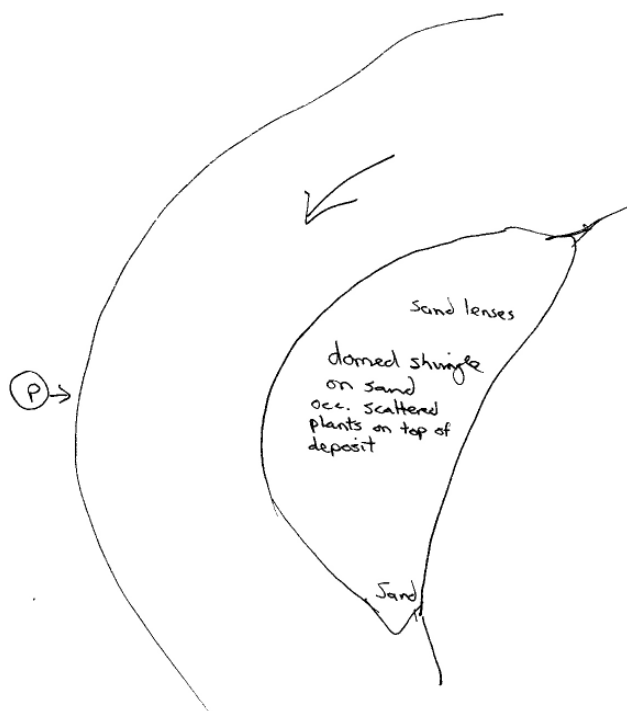
features present are shaded yellow


Site Name <i>Rheidol Shingles and Backwaters</i>				Site Code <i>AR8</i>	
Landowner/ Tenant (if known)				River <i>Afon Rheidol</i>	
				Grid Ref <i>SN60498030</i>	
				Surveyor <i>SMH/JP</i>	
Area of Deposit <i>800 m²</i>		Stream width <i>5 m</i>		Survey Date <i>23 Feb 2010</i>	
Deposit Type <i>Point Bar</i> Lateral Bar Island Fan Braided Channel Old Channel					
Substrate type(s) Silt <i>Sand</i> <i>Gravel</i> <i>Shingle</i> Cobble Boulder					
Deposit Topography Humped <i>Complex</i> Flat Backwater channel					
Vegetation Predominantly bare 80 % Scattered 20 % Established %					
Distance to nearest ERS deposit (m) Upstream Downstream 5					
% shade from canopy 5		Adjacent land use <i>scrub</i>			
Alien plants: species/ percentage ground cover				River engineering YES/NO	

Brief description of the site:

High, domed shingle on sand point bar with scattered vegetation on the top. Surveyed from across river

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



		Environmental factors scale of 0-3 (zero-minor-moderate-major)										
	Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:	other:	
Invertebrate micro-habitats												
Stony water's edge (<1m zone)		70										
Sandy/silty water's edge (<1m zone)		12										
Shingle slope/top bare/sparsely vegetated		700										
Sand or sand/shingle on top of bar bare/sparsely vegetated		15										
Water seeping through ERS												
Sand deposits beneath trees												
Boulders with gravel matrix												
Cobbles												
Remnant pools on open shingle												
Damp sand		12							2			
Damp shingle												
Boulders on gravel/shingle												
Winter refugia terrestrial habitat (e.g. scrub)		Yes										
Area score	2	Habitat feature score		6						1		
Topography score	3	Connectivity score		3	Damaging impact score						1	
Habitat Potential Score		14			Habitat Condition Score						13	

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features present are shaded yellow


Site Name <i>Rheidol Shingles and Backwaters</i>				Site Code <i>AR9</i>	
Landowner/ Tenant (if known)				River <i>Afon Rheidol</i>	
Grid Ref <i>SN60458028</i>				Surveyor <i>SMH/JP</i>	
Area of Deposit	<i>500 m²</i>	Stream width	<i>5 m</i>	Survey Date	<i>23 Feb 2010</i>
Deposit Type	Point Bar	Lateral Bar	Island	Fan	Braided Channel
Substrate type(s)	Silt	Sand	Gravel	Shingle	Cobble
Deposit Topography	Humped	Complex	Flat	Backwater channel	
Vegetation	Predominantly bare	80 %	Scattered	10 %	Established
Distance to nearest ERS deposit (m)	Upstream	5	Downstream	100	
% shade from canopy	5	Adjacent land use		<i>scrub</i>	
Alien plants: species/ percentage ground cover				River engineering	YES/NO

Brief description of the site:

Relatively small but varied point bar with sand and shingle substrate with small area of scattered plants and some sward developing on the top of the bar around a small patch of willow.

Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs



				Environmental factors scale of 0-3 (zero-minor-moderate-major)										
			Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:	other:	
Invertebrate micro-habitats														
Stony water's edge (<1m zone)			120											
Sandy/silty water's edge (<1m zone)			5											
Shingle slope/top bare/sparsely vegetated			350											
Sand or sand/shingle on top of bar bare/sparsely vegetated			15		1									
Water seeping through ERS														
Sand deposits beneath trees			5											
Boulders with gravel matrix														
Cobbles														
Remnant pools on open shingle			9								1			
Damp sand														
Damp shingle														
Boulders on gravel/shingle														
Winter refugia terrestrial habitat (e.g. scrub)			Yes											
Area score	2	Habitat feature score		4		1						1		
Topography score	4	Connectivity score		3	Damaging impact score								1	
Habitat Potential Score		13			Habitat Condition Score								12	

ERS Habitat Assessment Form

features present are shaded yellow

Site Name <i>Rheidol Shingles and Backwaters</i>				Site Code <i>AR10</i>	
Landowner/ Tenant (if known)				River <i>Afon Rheidol</i>	
Grid Ref <i>SN60188043</i>				Surveyor <i>SMH/JP</i>	
Area of Deposit <i>1,800 m²</i>		Stream width <i>7 m</i>		Survey Date <i>23 Feb 2010</i>	
Deposit Type		<i>Point Bar</i>	<i>Lateral Bar</i>	<i>Island</i>	<i>Fan</i>
Substrate type(s)		<i>Silt</i>	<i>Sand</i>	<i>Gravel</i>	<i>Shingle</i>
Deposit Topography		<i>Humped</i>	<i>Complex</i>	<i>Flat</i>	<i>Backwater channel</i>
Vegetation		<i>Predominantly bare</i>	<i>95 %</i>	<i>Scattered</i>	<i>5 %</i>
Distance to nearest ERS deposit (m)		<i>Upstream</i>	<i>100</i>	<i>Downstream</i>	
% shade from canopy		Adjacent land use <i>scrub</i>			
Alien plants:		<i>Knotweed 2%</i>		River engineering <i>YES/NO</i>	
species/ percentage ground cover					
Brief description of the site: <i>High, complex lateral bar of shingle and gravel. Largely bare with some areas of successional vegetation developing and a small patch of Knotweed. This site is adjacent to a public footpath and appears to receive considerable human trampling</i>					
Sketch plan of deposit indicating distribution of microhabitats and position/direction of site photographs					

			Environmental factors scale of 0-3 (zero-minor-moderate-major)									
			Area	Dunging/grazing	Successional vegetation cover	Trampling	Vehicle tracking/compaction	Shingle extraction/digging	Siltation	Eroding	Shading:	other:
Invertebrate micro-habitats												
Stony water's edge (<1m zone)			130			2						
Sandy/silty water's edge (<1m zone)												
Shingle slope/top bare/sparsely vegetated			1700		1	3						
Sand or sand/shingle on top of bar bare/sparsely vegetated			30		1	3						
Water seeping through ERS												
Sand deposits beneath trees												
Boulders with gravel matrix												
Cobbles												
Remnant pools on open shingle												
Damp sand												
Damp shingle												
Boulders on gravel/shingle												
Winter refugia terrestrial habitat (e.g. scrub)			Yes									
Area score	3	Habitat feature score	4		1	8						
Topography score	3	Connectivity score	3	Damaging impact score								9
Habitat Potential Score			13			Habitat Condition Score						4



