



South Wales RIGS Group Site Record RIGS Description

SECTION A

General	South Wales
Site Name: Sully Island	File Number: Site_minescan_11
RIGS Number: 669	Surveyed by: Russell Society, Dave Wellings
Grid Reference: ST 1690 6690	Date of Visit: Numerous over many years up to time of writing
RIGS Category: Scientific, educational	Date Registered:
Earth Science Category: Mineralogical, stratigraphical, structural, sedimentological	Owner: Unknown Planning Authority: Vale of Glamorgan Council
Site Nature: Rocky cliff face and foreshore	Documentation prepared by:
Unitary Authority: Vale of Glamorgan Council	Documentation last revised: 23 rd January 2012
OS 1:50,000 Sheet: 171	Photographic Record: Attached
OS 1:25,000 Explorer Sheet: 151	
BGS 1:50,000 Sheet: E263	
<p>RIGS Statement of Interest:</p> <p>Sully Island is proposed as a mineral RIGS for two reasons. Firstly, because it hosts an interesting and rare local variation of the South Wales regional MVT (Mississippi Valley type) mineralisation. At one location, there is a small concentration of fluorite, as cubes up to 2mm in size, in association with galena, baryte, calcite and copper minerals in an area of bleached Triassic rock about 2m above the Carboniferous-Triassic unconformity, seemingly in association with a fault in the underlying Carboniferous Limestone. Fluorite is rare in South Wales, and this, albeit small locality, is an excellent example of the mineral.</p> <p>Secondly, because the minerals celestine and gypsum have been found in nodules in marginal Trias at the southeast end of the island; these are very rare on the island. On the south and west sides, in contrast, there are many quartz and/or calcite nodules up to 30cm in diameter. These are all very important in understanding the processes of deposition and replacement of evaporite minerals within hypersaline marginal red bed facies, as represented by the lower parts of the Triassic succession on Sully Island. These nodules and the minerals in them, especially the celestine and gypsum, enhance the importance of Sully Island's GCR sedimentological status even more.</p>	

Geological setting/context:

Triassic rocks unconformably overly Carboniferous Limestone. The Triassic rocks, which dip 10°-15° to the NNW, comprise basal breccias with overlying marls and sandstones; they provide “excellent sections in the marginal facies of the Triassic Mercia Mudstone Group” (GCR write-up).

Carboniferous Limestone dips to the south-east at about 45° along most of the southern part of the island. At the south-east corner it dips to the east at about 30°. The location of the change in direction of dip coincides with a fault running NNE across the island. The Carboniferous Limestone at the east end of the island is structurally complex.

Notable locations include:

1 Fluorite – one location in association with galena, baryte and minor copper minerals at ST16966693 in an area of “bleached” Triassic rock about 2m above the unconformity; there appears to be an association with a N-S fault in the underlying Carboniferous.

2 Galena, at the south-east side of the island in Carboniferous Limestone, occurs in veins and veinlets with quartz, calcite and baryte, and as small clusters, within an area of 300-400 square metres around ST16966691. There is evidence of previous working.

3. Galena in Carboniferous Limestone and Triassic breccia on south side of island around ST16826689 covering an area of about 150 square meters, again in veinlets in association with baryte and quartz, and related to the above mentioned NNE fault.

4 Copper. Thin vein showing copper mineralisation in calcite at ST16576685 in Trias close to the unconformity, may be associated with a slight dome structure.

5 Nodules in Triassic rocks on the south and west sides of the island, in cliff faces or the top of the foreshore. Analysis shows them to be mainly quartz with some carbonates. Thought to be originally gypsum nodules.

6 Nodules of calcite, again in Triassic rocks, now seen as voids containing calcite crystals. One in situ nodule found recently on the site visit contains calcite, gypsum and celestine, at ST1691566917.

7 One loose nodule found in a recent rock fall containing celestine crystals, from Trias, ST1692066915.

8 There are calcite veins of very variable thickness in the Carboniferous Limestone and Trias. Haematite/goethite is also present as thin deposits in the Trias.

The mineralisation is important for two reasons:

Firstly, the lead-baryte-copper mineralisation, in the Carboniferous Limestone and the Trias just above the unconformity, is an important local variation of the regional South Wales Mississippi Valley type mineralisation on account of the presence of fluorite (which is rare in South Wales), albeit at one locality only.

Secondly, the calcite and quartz nodules, especially the recent finds with celestine, gypsum and evidence of mineral replacement, are important as an integral part of the marginal Trias sediments; the GCR write-up states that Sully Island is “especially important for the evidence of hypersaline conditions”...“shown exceptionally well here”, a “critical site”. The evaporite minerals enhance this importance even more.

References:

BEVINS, R E and MASON, J S. 2000. Welsh Metallophyte and Metallogenic Evaluation Project.

Results of a mineralogical site survey of Glamorgan and Gwent compiled by the National Museums and Galleries of Wales (for CCW).

GCR volume on British Triassic red beds – Sully Island

PRACTICAL CONSIDERATIONS: Please score Accessibility and Safety Red Amber or Green			
Accessibility:		X	
Comment: Access is on foot across a rocky causeway for three hours either side of low water. This can be slippery.			
Safety:		X	
Comment: Care needs to be taken in crossing cliffs for access to the foreshore, and in crossing the rough rocks of the foreshore itself, some scrambling; also care needs to be taken to ensure that people are not cut off by the tide. There have been cliff falls			
Conservation status: GCR already on Sully Island for its marginal red bed facies.			

OWNERSHIP/PLANNING CONTROL: Owner/tenant: Unknown Planning Authority: Vale of Glamorgan Council Planning status/constraints/opportunities: None known.

CONDITION, USE & MANAGEMENT: Present use: The island is regularly visited by many people for leisure (open access at moment) Site condition: Good exposure on cliff faces (but steep) and foreshore. The rocks of the foreshore, most of which is below high water, are rough and uneven and some are covered by pebbles and seaweed. Potential threats: Erosion, especially from the cliffs. The island was up for sale in 2009 – could new owners pose a threat? Old artillery fragments are present on the east and south-east sides; below low water there may still be live/unexploded shells. A Severn Barrage would seriously affect the amount of exposure and access. Site Management: Check annually for state of exposure (eg cliff faces) and safety

SITE DEVELOPMENT: Potential use (general): Good site for the education of the public – there are several features of interest suitable for sign boards and/or a leaflet, the mineralisation at the east end being of particular interest. Potential use (educational): There are many geological features of interest on Sully Island – it has already been delineated as a GCR site for these. Mineralogically, the east end and south side, plus the nodules, are of interest for students (university, possibly A level).

Other comments:

The site was investigated in detail in 2008 to 2010, visited again on 11 September 2010. Any visit is best made at times of spring low tide.

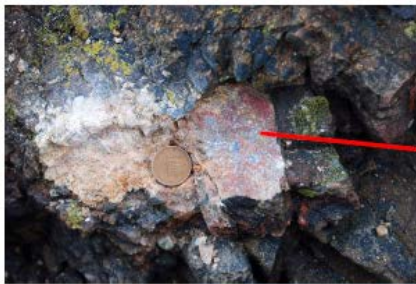
Photographic Record



Sully Island photos 2008-2010
Taken by D S Wellings



Fluorite vein and sample east side ST16966693



Galena cubes from
a nearby gully



Galena veinlets, east side



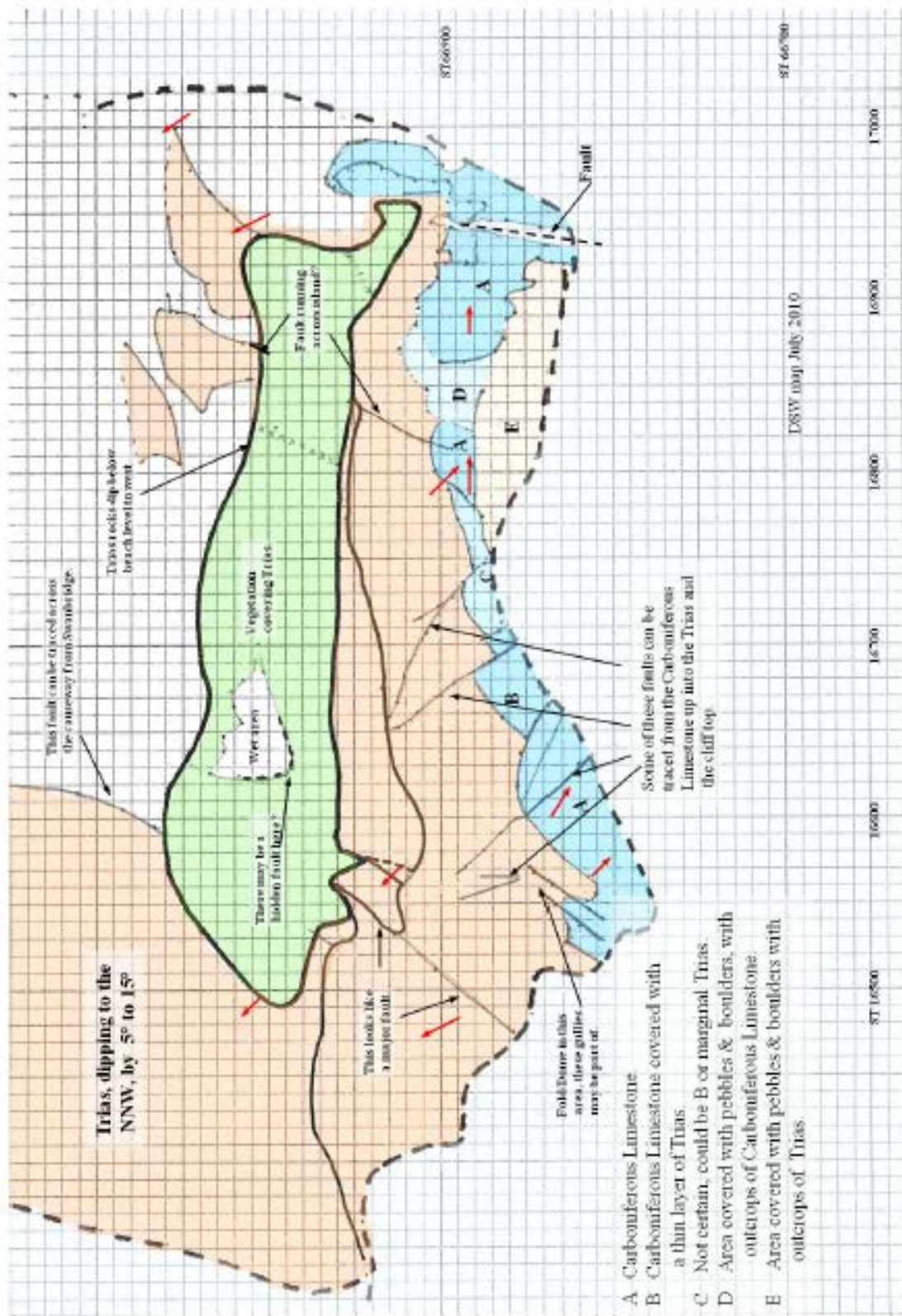
Area of galena veinlets, south side
From cST16786688 looking east

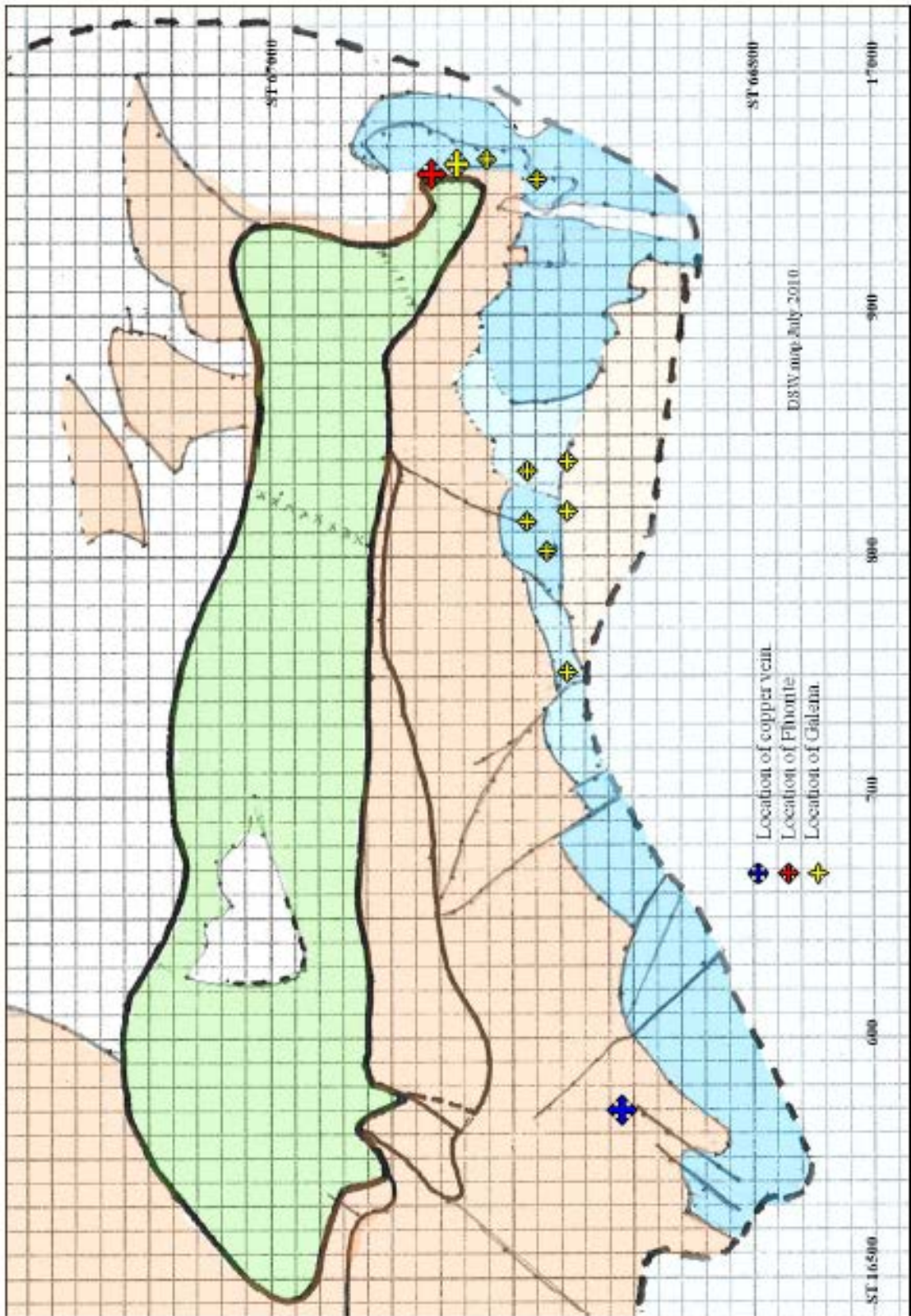


Copper minerals, vein at ST 1657 6685



Celestine in nodule ST 1692 6692





Appendix

Citation for Sully Island from Bevins and Mason (2000)

*GCR for Pennine-Fluctuant
not minerals*

GCR REVIEW OF METAL MINES AND MINERAL SITES in GLAMORGAN/GWENT SITE CITATION

<p>SITE NAME: Sully Island MINESCAN REF No: OC 6</p> <p>1:50000 OS map no Landranger 171 1:25000 OS map no Explorer 151 NGR: ST 165 670</p> <p>LOCATION: Barry, South Wales TYPE of SITE: Natural coastal exposures</p>	<p>SITE SCORE: 205 RANKING: RIGS</p> <p>SITE INSPECTION: DATE: Sept 1999</p> <p>SURVEYED BY: J.S. MASON for Dept of Geology, NMGW</p>
<p>RIGS STATEMENT OF INTEREST:</p> <p>Excellent coastal exposures reveal the relationship of the regional MVT vein mineralisation, thought from evidence at the Ogmere Coast GCR site to be Jurassic in age, to the Carboniferous-Triassic unconformity. The mineralisation here is also noteworthy for carrying fluorite, an uncommon mineral in South Wales. The combination of these factors lends the site considerable importance in regional terms.</p>	
<p>GEOLOGICAL/MINERALOGICAL DETAILS:</p> <p>GEOLOGICAL SETTING:</p> <p>Lower Carboniferous limestones, dolomitised in places, are unconformably overlain by Triassic basal breccias and overlying sandstones and marls. Broadly E-W trending Variscan fractures in the limestones have been reactivated and extended up into the Triassic rocks, and are mineralised, particularly at the northeastern seaward corner of the island.</p> <p>PRIMARY MINERALOGY:</p> <p>Galena-calcite veins with minor chalcopryite hosted by the Carboniferous limestones pass up into more complex parageneses developed in Triassic rocks. Here, more chalcopryite is present along with fluorite (a rare mineral in South Wales), pyrite, baryte and quartz. The reason why fluorite is of localised distribution in South Wales is not clear, but is one of the more interesting features of the South Wales MVT Orefield. Another feature of interest, just to the south of the main outcrop, is the existence of common cavernous geodes in the Triassic rocks. These are lined with scalenohedral calcite crystals and may represent solution cavities produced by the dissolution of an evaporite precursor.</p>	

GEOLOGICAL/MINERALOGICAL DETAILS (CONTINUED)

SECONDARY MINERALS:

Malachite and covellite part replace chalcopyrite, and poorly crystalline cerussite occurs with oxidised galena. Goethite commonly replaces pyrite.

PRACTICAL CONSIDERATIONS:

ACCESSIBILITY:

The island is accessed *via* a 'causeway' of slabby rock at low tide (see below).

SAFETY:

Strict attention must be given to the tides at this site. Follow the ebb tide down as soon as the 'causeway' has dried. This gives time for fieldwork. On no account should wading the causeway against a rising tide be attempted. The area not only has a huge tidal range but also very strong currents. People have been killed attempting to wade, as a warning sign at the landward end reminds one.

CONSERVATION STATUS:

Good, clean natural exposures (they may have been tried to an extent for lead). Over hammering will be of detriment to them.

RECOMMENDATION:

Sully Island has many features of interest and the mineralisation adds to them considerably. RIGS status is therefore clearly the way ahead.