



Tees Valley Geodiversity Action Plan 2011





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Introduction

What is Geodiversity ?

Geodiversity can be defined as “geological diversity or the variety of soils, rocks, fossils and minerals and geomorphological processes” (Prosser 2002) It underpins all our activities from farming to engineering, gardening to waste management, recreation to industry. Geodiversity links the earth, its people, their culture and biodiversity.

Within the Tees Valley geology has been exploited for hundreds of years, the alum industry, ironstone industry, jet and salt extraction have all played a part in creating the landscape and heritage of the area. From the clay used to make bricks, and sandstone for walls, to the limestone that lines the blast furnaces, geology has shaped the Tees Valley into the place we live today. The distinctive landforms of Roseberry Topping and Freeborough hill, along with submerged forests, all tell the story of a landscape with a long history rich heritage and interesting geology.

What is a Geodiversity Action Plan?

The Tees Valley Geodiversity Action Plan (GAP) is a document that sets out how the geodiversity within the Tees Valley will be managed. The Tees Valley GAP was launched in 2003 and identifies what we would like to do, how we are going to do it and when it will be done.

The aims of the Tees Valley GAP are:

- To conserve sites of geodiversity interest.
- Provide geological support to local education groups.
- Raise geodiversity interest.
- Encourage and work with the local community.

What area does the GAP cover?

The Tees Valley constitutes an area of around 550km² situated on the NE coast of England, and is currently administered through the five Unitary Authorities of *Redcar & Cleveland*, *Middlesbrough*, *Stockton-on-Tees*, *Hartlepool* and *Darlington*.

The Tees Valley is bounded by County Durham, North Yorkshire and the North Sea. It includes the Lower Tees Valley, the River Tees estuary, the hills and coast of East Cleveland and part of the North York Moors National Park.

Introduction



What are RIGS?

Regionally Important Geological and Geomorphological Sites (RIGS) are non-statutorily protected sites of regional and local importance for geology and geomorphology in the United Kingdom. RIGS may be designated for their value to Earth science, and to Earth heritage in general, and may include cultural, educational, historical and aesthetic resources. They are the most important places for geology, geomorphology and soils outside statutorily protected nature reserves and SSSIs.

RIGS locations are designated by locally developed criteria. The sites are selected and designated according to their value for:

- Educational fieldwork in primary and secondary schools, undergraduate level and adult education.
- Scientific Study by both post graduates, professional and amateur earth scientists.
- Historical significance in terms of earth science knowledge and local heritage value.
- Aesthetic quality of the landscape.

If a site is of geological or geomorphological interest and meets one or more of the RIGS criteria then it can be put forward for designation with the local authorities as RIGS in order to be recognised and protected. It is worth noting that not all geodiversity can be protected but that is not to say that it has no value, it just doesn't meet the standard for RIGS designation.

Geodiversity is around us everywhere and it would be impractical to designate the whole of the surface of the earth as a RIGS location so RIGS groups have to be selective.

Who are Tees Valley RIGS group?

Tees Valley RIGS group are made up of volunteers who share an interest in local geology. Anyone is welcome to join and get involved and members come from a range of different backgrounds and places across the Tees Valley. The group has its own bank account and has successfully applied for funding over the past few years. It works closely with the Tees Valley Wildlife Trust to maximise the benefits of partnership working.

Geodiversity today

RIGS locations can still be overlooked by the public and local authorities because they are not statutory designations. RIGS status is more of a recognition tool rather than a restriction to development. By their very nature sites of geodiversity can be under threat from:

- Landfill projects and flooding.
- Quarrying developments.
- Inappropriate reclamation schemes.
- Land use changes.
- Ignorance, poor consultation, neglect and extensive vegetation coverage.



Geology of the Tees Valley

The district's underlying geology is eclectic, ranging in age between c.300 million years in the NW to c.165 million years in the SE, and spans the transition from Palaeozoic to Mesozoic faunal eras. Including possibly the planet's greatest extinction event which occurred during the Permo-Triassic period. The area lies structurally within the Cleveland Basin, a sub-region of the North Sea Basin, on the N side of the Market Weighton axis.

Tertiary times saw emplacement of a narrow tholeiitic dyke running ENE-WSW through the district which has its origins in the Mull area of W Scotland.

Recent deposits and landforms are complex and thought to be almost exclusively Devensian and Flandrian age.

Carboniferous (363-290 Million years ago)

Late Carboniferous strata occur N of Darlington. They appear to be of Westphalian age and are yet to be comprehensively surveyed by TVRIGS. These are the oldest deposits in the district at c.300 million years old.

[photo of darlington site]

Permian (290-245 Million years ago)

On the coast around Hartlepool and along steep sided dunes in the area, can be found exposures of Permian Magnesian Limestone. These formed in a shallow tropical sea and are the remains of an algal reef. Repeated cycles of evaporation of the shallow Zechstein Sea deposited thick beds of evaporites (rock salt, anhydrite, gypsum, and sylvite). These continue deep below the surface and have been formerly exploited for anhydrite at Billingham. Sylvinite and halite, are today extracted by Cleveland Potash Ltd., at Boulby near Staithes. Magnesian Limestone is exploited at several working quarries in the Darlington and Hartlepool areas.

[Photo of Hartlepool site]

Triassic (245-208 Million years ago)

Triassic rocks are only poorly-exposed in the Tees Valley, with only a few coastal and riverside exposures. The rocks from this period are sandstones and mudstones that formed in an arid tidal environment. Preserved in the rocks are mud cracks from periods when the sand dried out and ripple marks from times when the area was under water.

[photo of Seaton Carew]

Geology of the Tees Valley



Jurassic

The rocks found South of the Tees are Jurassic in age. They formed in mostly a marine environment and are a mixture of mudstones, sandstones and ironstones. These rocks provided the basis for the ironstone, jet and alum industries which have characterised East Cleveland's Industrial Heritage.



Lower Jurassic sea cliffs at Boulby near Staithes.

Jurassic rocks also contain a wealth of fossils including ammonites, large marine reptiles - ichthyosaurs and crocodiles, plants and dinosaur footprints.

There are no rocks exposed in the Tees Valley from the period between the end of the Jurassic 146 Million years ago and the Tertiary 65 Million years ago.

Tertiary (65-2 Million years ago)

Around fifty-eight million years ago the Atlantic ocean started to form and Britain separated from America. These large changes had a dramatic effect on the surface of the earth and the remains of this are seen locally as the Cleveland Dyke. This is the only volcanic rock in the Tees Valley and formed along a narrow crack that runs across the area. It was quarried all along its length as this hard rock was very useful as road-stone.

[photo of cliff rigg]

Recent (2 Million years ago - present day)

The Tees Valley's youngest deposits are linked to the time since the last ice-age 70-10,000 years ago. This area was covered in ice at this time and this carved out landforms and deposited large amounts of debris collected on its way here. This debris can be clay, sands and gravels all of which have been exploited in the current development of the Tees Valley.

At both Hartlepool and Redcar, underlying the modern beach deposits, can be found peat deposits laid down c.6,000 - c.8,000 years ago before modern sea levels were established. These contain important evidence of early human settlement of the area and sea level change.

[photo of redcar submerged forest]



Past Achievements

Over the last 6 years there has been a huge amount of progress in delivering the Tees Valley GAP. Lots of hard work has gone into making the plan a reality. Through the hard work and success of projects the original objectives have been met or are being delivered by TVRIGS, Tees Valley Wildlife Trust and other partner organisations.

Some of the success so far:

Geodiversity and conservation management

Once a RIG site has been designated the work to protect, conserve and if appropriate promote it starts. Work to do this has been funded by a variety of sources and has included creating management plans with land owners and interested organisations, putting up interpretation boards and running practical volunteer tasks to remove vegetation and clear litter.

[interp board photo]

Raising Geodiversity Awareness

There has been a big change in public perception of geology over the last few years, with far more attention in the media. Onto this background projects run by Tees Valley Wildlife Trust and TVRIGS aimed at helping as many people as possible learn about the heritage and value of the geology of the Tees Valley.

The Tees Valley Wildlife Trust GAP project, funded by HLF, started things off and, with the support of RIGS and other local experts, regular walks with a geological theme have become popular with many people across the Tees Valley.

Local Schools have been encouraged to look at geology through school visits and field trips. Work with local artists linking geology, art and photography helped the sites to be interpreted in many different and exciting ways. Displays, exhibitions and geologically-themed activities have further promoted that idea that geology is relevant and fun.

[Rock and Fossil Roadshow image]



Production of information dissemination tools

The Heritage Lottery Funded GAP project produced a very popular leaflet entitled *The Geology of the Tees Valley*. A more detailed interactive CDROM was produced and distributed to all schools and libraries in the region. Six sites were chosen across the Tees Valley to have interpretation boards installed explaining the geology and heritage of the area.

Funding from ALSF supported the development of a TVRIGS website (tvrigs.org.uk) to be set up. The website contains much of the data from the previous GAP, as well as information on the local geology and industrial archaeology and copies of GeoTrails are available for download.



GAP objectives.

Audit of Geodiversity.

Description:

In order to conserve, manage and promote the geodiversity of the Tees Valley it is first necessary to know what geodiversity is present. This includes knowing what skills and knowledge are present as well as the rocks and landforms themselves.

Current factors affecting it

We cannot protect what we don't know about.

Previous Activity

For the previous GAP a database of sites was produced and distributed alongside the original document and on the internet. This formed the basis of the new list. Previously the audit concentrated on bringing together local geological establishments and creating a sustainable RIGS group to act as a focus/key provider and implementer for the new plan.

Vision Statement:

To gather together data on all geological and geomorphological sites and resources into one accessible place.

Targets:

Target 1: To create a catalogue of all known sites of geological exposures, geomorphological features and geological resources (i.e. museums, libraries, universities, scientific societies etc.)

Goal 1: Create a searchable database of all known sites by the end of 2011.

Target 2: Continue to survey area for new or undiscovered exposures or features.

Goal 2: Use existing system for visiting/surveying data found at new sites.

Target 3: To increase understanding of the geology and geomorphology of the Tees Valley.

Goal 3: Produce and publish new research on geology and geomorphology.

GAP objectives.



Code	Action	TVRIGS lead contact	Interested Parties	End Date	Priority
AG.1.1	Create a digital database of all known geological exposures, features and resources	D. Goldring		End 2011	1
AG.1.2	Revisit all known sites to check for existence and create a baseline survey			Ongoing	1
AG.2.1	Visit new sites and fill in primary survey form			When appropriate	1
AG.3.1	To get the equipment necessary to do research. e.g. auger and microscope.				3
AG 3.2	To encourage organisations to research key features and sites within the Tees Valley				2
AG 3.3	To seek help from geology professionals to provide support/information and training to TVRIGS	D. Harbinson			2



GAP objectives.

Inclusion of Geodiversity in Local Authority Policy.

Description:

The Local Authority has overall control over the development of an area and protection of features within it. In order to ensure that geodiversity is protected for the future it is necessary to inform all the local authorities of the important sites within the area and the reasons why they should be protected. By working with local authorities it is possible to make sure that geodiversity becomes something to be considered with every development and potential for improving the geodiversity can be realised.

Current factors affecting it

People being unaware of the value of geodiversity to an area.

Previous Activity

There are 33 RIGS already protected within the Tees Valley and as new sites are surveyed more are likely to be protected by local authorities.

Vision Statement:

To work with all local authorities to ensure that all sites of geodiversity importance within the Tees Valley are protected and that geodiversity features within all relevant local authority plans.

Targets:

Target 4: For the RIGS group to act as local geology experts for planning and policy within local councils.

Goal 4: Answer any geodiversity queries from the local authorities as they arise.

GAP objectives.



Code	Action	TVRIGS lead contact	Interested Parties	End Date	Priority
LA.4.1	Write to the planners and policy departments within local councils explaining the work of RIGS	B. Andrews	All local authorities and North York Moors National Park	2011	2
LA.4.2	Act as Local Geology experts for the planning departments	B. Andrews	All local authorities and NYMNP	Ongoing	1



GAP objectives.

Geodiversity Conservation and Management.

Description:

There are many sites that have been highlighted as having geodiversity importance but without correct management may end up being lost or damaged. For some sites change is inevitable and necessary as erosional processes take place. For such evolving sites, monitoring is the only course of action. For others the features of importance could be overgrown or overlooked. Putting a plan together to manage and conserve sites and liaise with the relevant authorities can protect and improve the geodiversity resources within the Tees Valley. Many sites have a biodiversity or archaeological importance and linking management plans for geodiversity to the biodiversity and archaeological importance of a site enhances the understanding and enjoyment of it.

Current factors affecting it

Natural erosion and deposition.
 Climate change - changing sea level.
 Inappropriate landscaping.
 Overgrown with vegetation.
 Infilling of quarries.

Previous Activity

In 2010, a grant from Natural England enabled geodiversity site management plans to be written for 8 RIGS across the region. These plans highlight the important features of a site as well as management work that could be done to improve the sites.

Work has also been done over the last six years on several other RIGS to improve them as part of the GAP project funded by HLF (2006-2008), and the ongoing work of TVRIGS. This includes cutting back vegetation, clearing litter and debris and installing interpretation at sites.

Vision Statement:

To ensure that all sites that have been designated for their geodiversity value are managed in a way that best conserves the geodiversity, biodiversity and archaeological value for the future.

Targets:

Target 5: To conserve existing geodiversity sites.

Goal 5: To create management plans for all existing sites.

Target 6: To designate new sites of geodiversity importance.

Goal 6: To ensure that all new sites that are suitable are designated as they are found.

Target 7: To implement management actions already highlighted in existing site management plans.

Goal 7: To follow the timetables for tasks suggested in existing management plans.

GAP objectives.



Code	Action	TVRIGS lead contact	Interested Parties	End Date	Priority
GM5.1	Write management plans for all existing RIGS using our own proforma				2
GM6.1	Suitable new sites are put through the process to be recognised as RIGS/LGS	B. Andrews		Ongoing	1
GM7.1	Freebrough Hill Management Plan actions	A. Simkins A. Cooper		See Plan	2
GM7.2	Whelly Hill Management Plan actions	J. Werbiski B. Stephenson		See Plan	2
Gm7.3	Roseberry Topping Management Plan actions			See Plan	2
Gm7.4	Little Scar Management Plan actions			See Plan	2
Gm7.5	Guisborough Forest Management Plan actions			See Plan	2
Gm7.6.	Eston Hills Management Plan actions			See Plan	2
Gm7.7	Errington Woods Management Plan actions			See Plan	2
Gm7.8	Saltburn Gill Management Plan actions	A. Simkins A. Cooper		See Plan	2



GAP objectives.

Raising Geodiversity Awareness.

Description:

The concept of geodiversity is relatively new and little understood, and its importance is often overlooked. A vital part of protecting sites is alerting people to their value and importance. With geology the value is often not immediately apparent and explaining this to the wider community is not an easy task.

Current factors affecting it

Not well understood, often perceived as boring.

Bad explanations often put people off.

Reaching wider audiences is difficult.

Previous Activity

The TVGAP project funded by HLF (2006-2008) started the process of raising the profile of geodiversity. Interpretation boards and leaflets were produced explaining the Geology of the Tees Valley, education packs for schools were created, a CD ROM made available in schools and libraries, talks to community groups and guided walks were run for a wide variety of people at venues across the Tees Valley.

This work was built upon by TVRIGS with the production of downloadable GeoTrails as part of a project funded by ALSF. These trails were produced in an mp3 format to enable the information to be accessed in as many ways as possible.

Vision Statement:

To increase appreciation and understanding of the importance of geodiversity within the Tees Valley by the wider community.

Targets:

Target 8: Popularise and promote use of sites for education where safety and access are suitable.

Goal 8: To provide resources for key local sites to help visitors understand the geodiversity of them.

Target 9: To raise Geodiversity Awareness within the Tees Valley.

Goal 9: To raise the profile of geodiversity and the work of RIGS through activities, leaflets and press releases.

Target 10: Production of information dissemination tools

Goal 10: To produce new and inventive ways for information dissemination and maintain and distribute existing ones.

GAP objectives.



Code	Action	TVRIGS lead contact	Interested Parties	End Date	Priority
RA8.1	Use TVRIGS website to highlight key locations to visit.	A. Cooper			2
RA8.2	Create online GeoTrails to publicise key sites				3
RA8.3	Run geology themed events i.e. rock and fossil road shows/ guided walks at key sites.	B. Andrews			2
RA8.4	Liaise with landowners/managers to help them promote the geology of key sites.				2
RA9.1	Promote TVRIGS and geodiversity at local events and shows				2
RA9.2	Publicise work of TVRIGS in local press				2
RA10.1	Produce a trail/booklet on the building stones of Middlesbrough	A. Simkins			3
RA10.2	Reproduce <i>The Geology of the Tees Valley</i> leaflet and make it available to download.	B. Andrews			3
RA10.3	Raise profile using TVRIGS and other websites of mp3 and GeoTrails				2
RA10.4	Create geocache/ earthcache at RIGS				2
RA10.5	Seek funding to develop iPod/ downloadable maps/trails/info.	D. Harbinson			3
RA10.6	Use key internet sites i.e. Wikipedia to promote local geology and sites.	A. Cooper			2



GAP objectives.

Community and Partnership Working.

Description:

It is beyond the capacity of the Tees Valley RIGS group to deliver all the actions within the GAP. The best way to increase awareness and understanding of the work in the GAP, and to help foster a feeling of ownership of the sites, is by linking with other organisations. By working together, more can be achieved, different skills brought in and more funding become accessible. Different groups will bring in new skills, enthusiasm and people.

Current factors affecting it

Links between Geodiversity and other areas not clear.

Previous Activity

The Tees Valley RIGS group already has strong links with many other organisations including: Tees Valley Wildlife Trust, Natural England, Cleveland Industrial Archaeology Society, Tees Archaeology, North East Geological Society, North East Yorkshire Geology Trust.

Vision Statement:

That Tees Valley RIGS group continues to build upon its existing partnerships and continues to create new links to help deliver the many aspects of the GAP.

Targets:

Target 11: To continue and expand partnership working.

Goal 11: To contact all existing partners and discuss opportunities for working together.

Target 12: Increase community involvement within the RIGS group and geodiversity action plan delivery.

Goal 12: To work with five new community groups and individuals over the next five years.

GAP objectives.



Code	Action	TVRIGS lead contact	Interested Parties	End Date	Priority
CP11.1	Create leaflet/pdf explaining RIGS and geodiversity and what we do and send it out to local groups to promote ourselves				2
CP11.2	Hold a small celebration event/lecture day/open day and invite existing and potential partners.				3
CP12.1	Publicise work of RIGS in local press and encourage others to join the group				2
CP12.2	Publicise practical conservation tasks within local community to encourage them to get involved				2



GAP objectives.

To Review GAP after 5 years.

Description:

The Tees Valley GAP is an evolving document and as objectives are achieved new actions will arise. It is important to make sure that the current actions are assessed to see if they are still relevant, still working towards our original aims and to celebrate our achievements so far.

Current factors affecting it

The cost implication of reviewing is hard to find funding for.

Previous Activity

TVRIGS Group website already contains a modified version of the database of sites created during the delivery of the last GAP in 2003.

Vision Statement:

That the TVGAP remains a relevant document for the district, ensure it is kept up-to-date, and perhaps most importantly that the document is utilised.

Targets:

Target 13: To make Tees Valley GAP available to any interested parties.

Goal 13: To add the completed Tees Valley GAP to the TVRIGS website by end 2011.

Target 14: To review GAP after 5 years

Code	Action	TVRIGS lead contact	Interested Parties	End Date	Priority
RG13.1	Make GAP available on TVRIGS website	A. Cooper		2011	1
RG13.2	Update GAP actions on website	A. Cooper		Annually	1
RG14.3	Review/redraft GAP in 2015	B. Andrews		2015	1