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Quarrying and mineral extraction in the Peak District National Park

National Parks are scenically beautiful places which are specially protected by law in order to conserve and enhance the special qualities and for their enjoyment by the public. The Peak District became the UK's first National Park [PDNP Fact Sheet] in 1951. Shaped by natural forces over millions of years, and by human activities over thousands of years, the Peak District National Park provides a breathing space for millions of visitors and is home to around 38,000 people.

The geology [Rocks and Minerals Fact Sheet] of the Peak District National Park contains a variety of rocks and minerals

including – limestone, gritstone, shale, lead, fluorspar, barite, copper, calcite and Blue John.

Mineral extraction in the Peak District date back to prehistoric times. Mineral extraction has influenced the shaping of the landscape we see today, and in providing a livelihood for local people. However, mineral extraction operations have the potential to generate significant environmental impacts on the landscape, environment and amenities of the area, including the emissions of noise and dust

Mineral extraction is one of the most contentious activities in the Peak District National Park since it conflicts with the purposes of National Parks which are to conserve and enhance the landscape, wildlife and cultural heritage, and to promote enjoyment of its special qualities.

Many of the quarries and mines in the Peak District were

operating before the area became a National Park in 1951. The National Park boundary was drawn so that it excluded many of the main limestone quarries in the Buxton area (which is why it is an odd shape). Old but extant planning permissions and society's ongoing demand for minerals are the main reasons for continuing large-scale mineral extraction in the Peak District National Park.

Mineral extraction has been part of the Peak District economy for centuries; it continues to provide jobs and revenue for the area, although the number of local people working in the industry was less than 2% in 2001. In 2008-09 there were 47 'active' quarries in the Peak District National Park, covering 3,299 hectares. Around half of these are actively extracting material; the rest are subject to on-going restoration or are not operational for other reasons.

Rocks and minerals: A natural resource

About 360 million years ago [Rocks and Minerals Fact Sheet], most of what is now the Peak District was under a shallow tropical sea. The fossilised remains of the marine creatures, such as shellfish, sea-lilies ('crinoids')

and corals, formed the limestone that lies under the White Peak area of the Peak District National Park. Around 326 million years ago, sands, gravels and mud were deposited on top of the limestone to form the

gritstone and shale of the Dark Peak. Movements in the Earth's crust caused cracks in the limestone and hot liquids deposited veins of minerals in these cracks.

Limestone

In Roman times, Peak District limestone was quarried for building stone and to make lime for mortar. The limestone in the area is often very pure (high in calcium carbonate) and has many chemical, industrial and construction uses. As early as 1521 quicklime was being used to improve agricultural land [Farming Fact Sheet] and lime kilns (for heating limestone to

produce quicklime) were a familiar sight in the Peak District. Lime was also used in lead smelting. The cutting of canals and, later, the opening of the Cromford and High Peak Railway increased lime exports, to be used in building and other industries.

Limestone quarrying grew enormously in scale throughout the 20th century reaching a peak of 8.5 million tonnes in 1990.

In 2008/9 4.1 million tonnes of limestone was quarried for aggregate uses and 3.8 million tonnes for non-aggregate uses from within the Park.

In 2008-09 there were 13 quarries with permission to extract limestone in the Peak District National Park. The largest are at: Hope (operated by Lafarge Cement (UK) Ltd); Tunstead/Old Moor (operated by Tarmac); Ballidon (operated by Tarmac). Limestone from the Peak District supplies markets in the east midlands, north west, Yorkshire, and the south east.

Shale

Shale is an important material in the making of cement, which is made by combining limestone and shale at very high temperatures in a kiln. Shale is extracted at Hope. The cement works at Hope, which is owned and run by Lafarge Cement (UK) Ltd, is close to supplies of both limestone and shale. The cement works was founded

in 1929 and now produces up to 1.3 million tonnes of cement a year. This is about 10% of the British supply. To produce this, the cement works uses 1,730,000 tonnes of local limestone and 305,000 tonnes of local shale each year.

The chimney of the works is 130 metres high, and emits gases released from the production

of cement. Special equipment is used to reduce the amount of dust produced by the cement plant. Major investment in the rail infrastructure on site during 2007-08 means that up to one million tonnes of cement can be transported by rail each year (the remainder goes by road). The Hope cement works employs about 200 people directly and is the largest single local employer in the Hope Valley.

Limestone

Gritstone was quarried in the Iron Age to make hand-powered stones to grind grain ('querns'). Later, it was quarried to make millstones for use in water, wind and steam mills, crushing stones for mineral extraction and as grindstones for the Sheffield

edge tool industry. For this reason, it is also called Millstone Grit. There are more than 1,000 discarded millstones scattered in parts of the Peak District National Park, and the millstone is the Park's symbol.

About a dozen sites have permission to extract gritstone for use as building stone and/or aggregate. The largest of these are at Grindleford, Stanton-in-Peak and Birchover. The stone is used nationally and locally in existing buildings for restoration and in new buildings.

Lead

Lead ore was mined from the time of the Romans until the early 20th century. It was very important both as a local source of income and as a national resource. Lead was extracted from galena, one of the minerals found within mineralised vein structures within the limestone.

From the 12th century onwards, the lead mining industry grew. A large number of mine shafts were sunk, sometimes through hundreds of feet of shale or sandstone, to reach the limestone where veins of lead ore could be found. The lead mining industry reached its peak early in the 18th century, when there were at least 10,000 miners at work. As mines went

deeper, flooding became a problem and much effort was put into draining them by means of soughs (drainage tunnels) and pumps.

By the 1870s lead mining was dying out. Lead could be obtained more cheaply from other places. The last big lead mine, Millclose Mine at Darley Bridge, closed in 1939.

Fluorspar

The veins within which galena was found also contains other minerals. Until the beginning of the 20th century, lead miners used to throw away these unwanted minerals ('gangue') onto spoil heaps. One of these minerals is fluorspar (calcium fluoride) which subsequently became important in steel-making and so the old spoil heaps and lead mines were re-worked for fluorspar ore.

Fluorspar is now used in a variety of processes including refrigerants, solvents, aerosol propellants, anaesthetics. It is also an ingredient in fluoride toothpaste.

Processing fluorspar involves crushing the ore finely and separating out the minerals using a method called froth flotation. This takes place at the vein mineral processing plant at Cavendish Mill, Stoney

Middleton. The waste is then disposed of as slurry in tailings lagoons. Settled tailings are excavated from the lagoons and used for backfilling voids left by minerals quarrying. Although this creates a temporary environmental impact it reduces long-term impacts.

Currently, the Peak District is the principal source of the fluorspar in the UK.

Barite

Barite (barium sulphate) is another mineral that is found in veins with lead ore and fluorspar. About

20,000 tonnes of barite are processed each year at Cavendish Mill and used as an additive in drilling fluid for oil

and gas boreholes, in paint manufacture and in other industrial products.

Calcite

Calcite crystals (calcium carbonate) are used for ornamental finishes, chippings for flat roofs and in wall surfaces.

Environmental impacts of quarrying

Mineral extraction activities have the potential to generate significant environmental impacts, including scars on the landscape. There are fewer quarries in the Peak District National Park now than in the mid-20th century, but those that remain are generally much larger in area and scale of production. The proposed progressive reduction in the overall number of mineral extraction sites will help reduce environmental

impacts overall. The expectation is that those quarries that remain will operate to modern standards and control and will be progressively restored. Aggregate quarrying firms pay an aggregates levy to the government some of which helps to fund local community and environmental improvement initiatives.

Transporting mineral on large lorries adds to congestion on the roads and affecting the amenities

and environment of the National Park, including impacts on residential properties and visitor enjoyment. Transporting the stone by rail reduces the environmental impacts. The quarries at Tunstead and Hope have direct rail links with Network Rail.

Although quarrying is often associated with harmful impacts, it can also have positive benefits. For example, previously worked and restored sites may provide increased biodiversity, geological and recreational value. Examples include the old dolerite quarry at Tideswell Dale, a Site of Special Scientific Interest, and Dirlow Rake near Bradwell, a restored fluorspar working.

The role of the Peak District National Park Authority

The Peak District National Park Authority is the planning authority for the area and is responsible for conserving and enhancing the natural beauty, wildlife and cultural heritage of the Park. It is also required to promote opportunities to understand and enjoy the Park's special qualities, and to consider the economic and social well-being of local communities.

The National Park Authority works in partnership with many other organisations to achieve these goals. When making planning decisions on mineral extraction proposals, the Authority needs to take account of national policy, the development plan policies, consultation responses, representations and all relevant material considerations.

It is current government policy that major development should not take place in a National Park save in exceptional circumstances. Because of the serious impact that mineral extraction may have on the natural beauty of these areas all mineral development applications must be rigorously examined and assessed in terms of:

- the need for the development in terms of national considerations of mineral supply;
- the impact on the local economy of permitting or refusing the development;
- whether reasonable alternative supplies are available;
- any detrimental effects on the landscape and recreational opportunities and the extent to which that could be moderated.

The proposed development plan policies in the submission version of the Local Development Framework (September 2010), with the exception of fluorspar and local small scale building and roofing stone proposals, makes provision for the progressive reduction in the proportion and amounts of aggregates and other land-won minerals.

By 2011 the Peak District National Park Authority expects the impacts of mineral working on the special qualities of the National Park and on communities to be reduced. As old mineral planning permissions expire there will be fewer quarries and those remaining will be managed to the highest environmental standards with agreed operating end-dates and restoration schemes.

Further information

- **National Park Management Plan 2006-II**
- **Lead Rakes Biodiversity Action Plan**
- **Minerals Policy Statement I: Planning and Minerals**
- Peak District National Park Local Plan 2001 (as amended)
- Peak District National Park Local Development Framework(LDF) –Submission Version 2010