



# Quarries:

*An Ideal Place to Promote Biodiversity* ...

**HeidelbergCement provides insight into developing biodiversity management plans and utilising these to promote a positive relationship between quarrying and the natural environment.**

**T**hanks to the great variety of landscapes and natural unfertilized soils, quarries present ideal locations to preserve and promote biodiversity. For HeidelbergCement, securing its mining activities also means promoting species diversity at all the company's quarries.

The term "biodiversity" is still rather new to the general public. As a keyword in the field of nature conservation, biodiversity describes the variety of ecosystems and the species within them, as well as the genetic diversity within a species. Scientists place the number of species worldwide at between 2 and 30 million. The wide range of this estimation



Figure 1. Partial living spaces. Extraction inevitably creates habitats that by their very nature are ephemeral or fragmentary (e.g. rock face and bench). They should not be discounted as important parts of the biodiversity and require recognition and management. Soil piles, standoffs, bunds, standing water, quarry faces, tracks, wheel ruts, and sumps all provide opportunities for wildlife habitats (Ketton Quarry, UK).

Figure 2. The Weisenau quarry (Germany) is an important area for flora and fauna with a big nature conservation value. Within the scope of nature trails around the quarries, guidance, information boards and the 'day of the open door', HeidelbergCement can demonstrate to the interested general public the contribution of nature conservation.



Figure 3. An ecologist explains to university students the mapping of rare annual psammophytic plants in a gravel pit. The whole mining area is a nature protected area. The mining activity is part of the management plan.

is indicative of how far scientific opinions differ on this topic. It is, however, a fact that more and more animal and plant species irretrievably vanish from our planet. The latest update of the IUCN Red List of Threatened Species™ shows that almost one-third of evaluated species are threatened with extinction, which is mainly caused by human activity. Some of the reasons for species disappearance are deforestation, environmental pollution and overfishing. Roads and railways cut through natural habitats, many animals and plants fall victim to increasingly intensive forms of land use, and ecosystems are being destroyed.

Biodiversity is not new to HeidelbergCement. For many years, the company has acted not only to preserve biodiversity at its quarries during extraction of the raw

material needed for its production processes, but also to promote it after extraction has ceased.

### Quarrying impacts on biodiversity

At first glance, many people think that quarries and aggregate pits exploited by mining companies have only a destructive impact on nature and hold no value for the preservation of biodiversity (large empty areas). It is true that quarrying encroaches upon the landscape, and entails destruction of forests, meadows and arable land. Natural soils, having developed over thousands of years, are carried off and interference to the groundwater balance occurs over a long period, but quarries also represent ideal places for biodiversity to develop.

For a long time, the mining industry did not do enough to improve its role in preserving nature. This is one of the main reasons why the industry has repeatedly seen serious conflicts with the public and nature conservation organisations in the course of approval processes and during rock-quarrying operations. Such conflicts will continue growing if the attitude of the mining industry remains unchanged, especially because legislation is becoming increasingly strict when it comes to ensuring the preservation and promotion of biodiversity in Europe, America and, in the future, presumably also in Asia.

Upon closer examination, the quarries and aggregate pits located in intensively used and cultivated areas throughout the world provide a last refuge for rare animal and plant species. Numerous scientific studies clearly prove that aggregate pits, stone quarries and other quarrying sites

## HeidelbergCement's 10 principles for the promotion of biodiversity

### Encouraging dialogue

- ✓ The group promotes the increase of biodiversity in the planning and implementation of restoration through a structured approach, in dialogue with all stakeholders.
- ✓ The forms of after-use are to be discussed with environmental authorities, nature conservation organisations and other interested parties.

### Increasing biodiversity

- ✓ Each mineral extraction site should maximise the land area with ecological value.
- ✓ Ecological and economic value of land after-use need to be fully considered as they can both advance the promotion of biodiversity.
- ✓ Planning and implementation of subsequent after-use will be carried out by specialists.
- ✓ HeidelbergCement promotes a high degree of biodiversity even in working quarries. Areas temporarily out of use should be managed to maximise ecological benefit.
- ✓ Certain areas of each quarry should be left to develop naturally.

### Protecting nature and environment

- ✓ Indigenous and regionally typical plant species will be favoured.
- ✓ It is imperative to protect the topsoil and subsoil. Soil resources need to be safeguarded, protected from erosion and either reused as soon as possible on restoration areas or stored for a transitional period to avoid damage or loss.
- ✓ Ground water and surface water must not be contaminated either during work or after-use.



Figure 4. For the Broad-bodied Chaser (*Libellula depressa*), ponds in mining areas are important habitats.



Figure 5. The Chalk-hill Blue (*Polyommatus coridon*) is a species of unimproved and unfertilized oligotrophic grassland communities. Its caterpillar foodplant is the Horseshoe Vetch (*Hippocrepis comosa*).

can be of very high value for nature conservation. Apart from their significance as habitats for rare and protected species, the interlinking capacity of quarrying sites is of particular importance for nature conservation.

As early as the 1970s, the first mappings in Europe provided evidence highlighting the great importance of aggregate pits for the dragonfly and amphibian species groups. Numerous studies conducted by biologists from all over the world have followed, contributing to the understanding of the quarry habitat. They show almost unanimously that natural landscapes of great significance to biodiversity developed in all areas where priority was given to natural restoration after cessation of or during quarrying operations. In addition, quarrying sites that were “classically” restored at high cost made a significantly smaller contribution to the preservation of species.

The following are the three main reasons for the high diversity of species at operational quarrying sites:

1. The quarrying activities create a large variety of landscapes. This highly dynamic environment creates new habitats, which therefore promote the development of high local species diversity.
2. In quarries and aggregate pits, raw soils that are poor in nutrients and free of pesticides create living conditions ideal for several kinds of species (like the little ringed plover or the sand martin).
3. Despite the mining operations, the disturbance level in quarry areas is relatively low. Areas that are left to nature can develop easily without human interference.

However, plant and animal communities in the newly developed habitats change over the course of time. This process, which biologists call “natural succession,” often leads to a decline in the variety of species in later developmental stages. Human intervention, i.e. regular maintenance and utilisation of the area, is thus crucial for the preservation of biodiversity.

## Promoting biodiversity also makes sense for the company

Hence, quarries and aggregate pits undeniably offer very high potential with regard to the protection of species and nature conservation and, at various locations, are already making a substantial contribution to the preservation of biodiversity. HeidelbergCement makes active use of this potential by transforming quarries and aggregate pits into species-rich biotopes and preserving them in order to significantly increase the likelihood of a positive outcome for approval processes, as well as to shorten their duration. Furthermore, this approach reduces the number of expensive special biological studies to a minimum. Finally, the company is also able to perform rock quarrying operations in areas with high biological diversity in such a way that they are acceptable in terms of nature conservation, while simultaneously conserving raw materials by conforming to a comprehensive biodiversity management system.

### Biodiversity management at HeidelbergCement

Traditionally, HeidelbergCement has placed a high priority on environmentally friendly mining methods and subsequent restoration of its quarries. Numerous mapping, renaturation and maintenance projects over the past 20 years demonstrate the ecological value of the Group's quarrying sites. In co-operation with the German Federal Ministry of Education and Research, a list of indicators was developed to measure biodiversity at the quarries. Individual examples that proved successful and the positive response from authorities and environmental protection organisations have led HeidelbergCement to implement a corporate guideline for the promotion of biodiversity

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at its quarries in Europe. It is the first company in the industry to issue such a guideline, the ten principles of which are geared towards promoting dialogue with all parties involved – such as environmental authorities, nature conservation organisations and the general public – as well as increasing biological diversity during and after quarrying in order to protect native landscapes and nature. As it will take specific regional characteristics into account, the purpose of the guideline will allow uniform measures for subsequent use of sites to be co-ordinated internationally, thus laying the foundation for systematic implementation of the biodiversity goals. In addition, the guideline defines Group-wide goals for the promotion of biodiversity at the quarrying sites, which HeidelbergCement aims to achieve by 2020. For example, the company has set a target to develop a restoration plan for 100% of its cement and aggregates quarries by 2020. The biodiversity guideline and numerous practical examples can be found on the company's website.<sup>1</sup>

“The biodiversity guideline ensures that all restoration



Figure 6. Breeding colony of the swallow sand martin in a quarry near Dnipropetrowsk (Ukraine).

measures applied within the Group take into account the economic, ecological and social needs of the neighbouring communities. It is important to systematically plan and implement our numerous projects worldwide, today and in the future, in such a way that the intended forms of restoration promote the preservation of biodiversity and help to increase the variety of flora and fauna found at our quarries,” explains Dr Rademacher, Biodiversity and Natural Resources Manager at HeidelbergCement.

“Through well-founded renaturation concepts and management plans, the company controls the management of biodiversity at the quarrying sites and the creation of valuable habitats – beginning with good restoration planning for the after-use of the quarries. The seemingly higher time-related and financial expense associated with such plans and their implementation is quickly recouped through greater planning and production certainty. Because the Group demonstrates its long-term commitment to environmentally friendly mining practices through the application of advanced renaturation methods, all those involved in approval processes will find it easier to support future planning activities. In addition, the creation of biologically diverse habitats makes it possible to integrate operational and former quarrying sites into existing protection areas systems (e.g. Natura 2000) and to use them as stepping-stone biotopes for nature conservation on the basis of their interlinking capacity,” further explains Dr Rademacher.

The following two examples of biodiversity management demonstrate how HeidelbergCement is contributing to the promotion of biodiversity without disruption to its activities.

## The sand martin protection programme

An example for successful biodiversity management at HeidelbergCement is the “sand martin” species protection programme established at numerous locations in Germany and throughout Europe. For the smallest European swallow, it is hard to find suitable breeding sites. Its original habitat is steep sand walls on seacoasts and riverbanks, and these have been strongly diminished as a result of straightening measures and flood control. Today, the species is found on Germany’s Red List and is subject to special protection under the Federal Nature Conservation Act (Bundesnaturschutzgesetz).

From May to September, the sand martin is a frequently encountered breeding bird at HeidelbergCement’s gravel and sand pits. The freshly broken off walls make ideal nesting sites for the small birds. But aggregate extraction and the location of breeding sites can interfere with each other if the animals build their nests in places where quarrying is necessary for production reasons. The sand martin species protection programme serves to identify in advance possible conflicts between quarrying interests and the interests of species and nature conservation and to prevent these conflicts through management and maintenance measures.

## Learning from nature

For many of these management measures, nature as well as its dwellers and their needs serve as role models and providers of inspiration. This principle is also evident in the sand martin species protection programme: the quarrying activities for the coming months are planned

during the winter, subsequent to an assessment of the actual breeding population of sand martins at the quarrying sites, an evaluation of the conflict potential and the elaboration of control measures. If quarrying is planned for spring or summer on a steep rock face that could be attractive to or is already used by the swallows, alternative breeding grounds for the birds are created in the form of artificial steep rock faces or break lines – similar to their original habitat. Additionally, the areas and nesting sites earmarked for quarrying are flattened before the birds return and thus become less attractive to them. An entrepreneurial approach to biodiversity management and the conservation of species does not always have to be accompanied by a highly complex package of measures. It is generally sufficient to orient oneself towards the original conditions found in nature and to preserve or restore an environment for flora and fauna that comes as close to their original habitat as possible.

## Habitat management at Ketton Quarry, UK

Grange Top Quarry is a large (over 500 ha) shallow strip mine yielding approximately 2.5 million t of mid-Jurassic limestone and shale per annum, providing a feedstock to the adjacent Ketton Castle Cement works.

The diversity of landscape and habitats consumed by the extraction activities has resulted in the need for a composite approach to restoration and the development of biodiversity. The aim is to recreate and enhance the mosaic of habitats that have been disturbed. This is being achieved by nurturing the following habitats:

- Restoration to Wolds’ mosaic landscape.
- Calcareous grasslands.
- Hedgerows.
- Woodland.
- Bat caves.
- Water bodies.
- Roadside verges.
- Partial living spaces.

The permit conditions require significant management, monitoring and reporting of the disturbed and recreated habitats. A habitat management scheme engineered by consultants and steered by partners delivers the successful outcomes. Research projects by consultants and university partnerships explore and inform specific elements of the scheme. Geographical information systems have been adopted by the quarry management to store, coordinate and share the habitat data collected during the evolution of the habitat management scheme.

## Biodiversity: an opportunity for mining sites

After more than 10 years of work in the field, HeidelbergCement clearly recognises that the promotion of biodiversity also makes economic sense for its mining activities. “Securing raw materials and ensuring cost-effective mining planning go hand in hand with biodiversity management. Each creates opportunities for the other,” concludes Dr Michael Rademacher. 🌍

## References

1. [www.heidelbergcement.com](http://www.heidelbergcement.com)