Cement Sustainability Initiative (CSI)

Biodiversity Management Plan (BMP)

Guidance

wbcsd

Contents

The World Business Council for Sustainable Development's (WBCSD) Cement Sustainability Initiative (CSI) represents 24 leading cement producers with operations in over 100 countries.

The CSI provides a platform for a shared understanding of sustainability issues, developing and distributing practical tools, facilitating effective stakeholder engagement and providing sustainable solutions. One of its key objectives is to address sustainable business practice within the cement industry in a collective and collaborative way. Task forces and working groups have been established to focus on key sustainability issues. Task Force 5 on Biodiversity and Land Stewardship (TF5) is one such group, and has already been the driving force behind the establishment of CSI Biodiversity key performance indicators (KPIs), the *Quarry Rehabilitation Guidelines* in 2012, the development of *Guidelines for Environmental and Social Impact Assessment (ESIA)*, and has been involved in road-testing of the Integrated Biodiversity Assessment Tool (IBAT), a biodiversity screening tool for member companies.

The *Quarry Rehabilitation Guidelines* were produced to offer a clear set of recommendations to cement companies for the development of a quarry rehabilitation plan. Like the *Quarry Rehabilitation Guidelines*, this document has also been designed to offer recommendations for the development of biodiversity management plans (BMP, also sometimes known as biodiversity action plans). Both guidelines are relevant to the whole life cycle of the quarry.

As companies differ in terms of their corporate strategy for biodiversity management, no specific recommendation is made on how this guidance document should connect with other management plans, frameworks or strategy. Nonetheless, the CSI's recommendation is that this guidance document sit within the broader environmental management strategy of the company. The aim of this document is to guide cement companies on how to better manage biodiversity by recommending a methodology and including many sources of information which the companies can use to develop tailored solutions. In the development of this guidance, TF5 has consulted with a range of stakeholders, including the International Union for Conservation of Nature (IUCN), The World Wide Fund for Nature (WWF), the International Finance Corporation (IFC), the European Bank for Reconstruction and Development (EBRD), and the European Aggregates Association (UEPG).

The conservation of biodiversity, and other elements of natural capital, is a global issue requiring collaborative solutions at scale.

However, action at a local scale is equally important. This document applies primarily to quarries, but the principles can be applied to any mining site. The primary audience for this document is environmental officers and operations managers, because a basic understanding of natural resources provides a good foundation for interpreting and acting on the guidance featured here. The secondary audience is quarry managers, with whom responsibility for decision-making on quarry operations lies and whose role it is to ensure that biodiversity is sufficiently incorporated into extraction and rehabilitation planning. The guidance is not intended to act as a stand-alone information resource, but rather to preface and complement necessary consultation with qualified biodiversity experts on a site's more specific management priorities. While this document has been developed for CSI member companies, it is also hoped that other industry participants will find the information provided here beneficial, thereby contributing to a wider improvement in biodiversity management standards in other industries.

A third potential audience for this document is non-governmental organizations (NGOs) and academic representatives working with cement companies to provide a framework on which to base their biodiversity management process. However, the document is not specifically tailored for this audience.

Biodiversity – nature's foundation – is seriously under threat

Biodiversity (i.e. the variety of ecosystems, species and genes) boosts nature's ability to provide the ecosystem services we all benefit from, like clean water, pollination of crops by insects, and erosion control. Sectors that benefit from such services include forestry, fishing, farming, tourism and the medical industry. There are also many less immediately visible ecosystem services, such as the climate regulation and natural flood defences provided by forests and carbon storage. Other very important but often less tangible benefits include cultural ecosystem services associated with religious, social, spiritual and indigenous values. But biodiversity is being lost at an alarming rate. A concept that is broader than biodiversity and helpful to include in this context is natural capital. A working definition of natural capital is the value of nature to businesses and the economy, and to people and society.

The link between biodiversity and the cement and aggregates industry

It is important to note the close relationship between biodiversity, ecosystem services and livelihoods when allocating land and natural resources. Healthy ecosystems ensure human well-being by providing food, materials (e.g. wood, crops, fibre, fruits and vegetables) and clean water, and also by breaking down waste materials. In addition, many plants and other organisms are useful in medical research or contain substances used as medicines. Minimising environmental harm is therefore a fundamental requirement for the sustainable operation of all industries. Even though creating new habitats through rehabilitation and mitigation is common practice for operators in the cement sector, the implementation of biodiversity management plans has only been widely adopted by leading companies in this field. Many companies are now realizing that it is important to manage biodiversity as part of responsible and proactive risk management, and these companies are now looking for guidance on how this can be done effectively. Managing biodiversity can also result in cost savings, because nature can typically provide services more economically and efficiently than man-made infrastructure (for example discharging and treating water in a wetland instead of a treatment plant). There are potential new revenue streams as well, where biodiversity on a site might be valued by people enough for them to

Are any of your operations or supply chains facing...

- Stricter public policies and regulation around natural resource management, including rivers, forests, wetlands, grasslands and coastal areas?
- Declines in freshwater quantity and quality declines?
- Uncertainty in energy provision?
- Floods, storms or drought?
- Pressure from NGOs to address biodiversity loss?
- Requests from customers or investors for your ecological footprint?

pay to visit or enjoy it e.g., bird-watching, or swimming and fishing in a wetland. Companies that demonstrate responsible business behaviour by minimising their ecological footprint and ensuring the welfare of the communities and environments in their areas of operation automatically have a competitive edge: they are more likely to avoid operational risks, to attract investors, to gain public and consumer support, and to retain high-value employees, for example. These companies are also more likely to gain access to resources through the permitting process. The cement and aggregates industries both depend and impact upon biodiversity and ecosystem services. Extracting has a direct negative impact, (although this can be minimised), while rehabilitation, if done appropriately, can have a neutral or positive impact on biodiversity. The local situation is important to understand when considering this impact – for example many companies operate within protected areas.

The sector also depends on biodiversity in a more indirect way, particularly through the provision of ecosystem services. For example, the sector relies on freshwater, biomass fuel, water filtration services by wetlands, as well as trees and plant species for rehabilitation.

Why this guidance?

The imperative for cement companies to address biodiversity management is clear and growing. However, one of the challenges in addressing this issue as a sector is that companies are at different stages in integrating biodiversity into their corporate and site-level planning. The objective of this document therefore is to provide practical guidance to all companies by presenting the key issues, explaining the connection between operations and healthy ecosystems, outlining some management approaches, and then linking to reference documents, data, tools and guidance so that companies can progressively implement biodiversity into site-level management through the development of an appropriately focused management plan. By addressing this objective, and encouraging the measurement and monitoring of clearly stated biodiversity targets, this document aims to support the objective of CSI member companies to minimise impacts and, where possible, to enhance biodiversity. In developing and promoting the use of this document, the CSI aims to set a high standard for land stewardship, leading the way for companies engaging in similar activities, and indeed other sectors, to reach further in terms of commitment to biodiversity.

This document leverages existing information and references and draws on examples and explanations that build on the content. A glossary is provided towards the end of the document to explain terms used in the chapters. Throughout this document, questions are posed to help the reader apply the guidance directly to his or her management scenario or question. Where relevant, decision trees, checklists, case studies and templates are provided.

Why is a BMP needed?

A BMP is a practical site-specific document developed and used by the site management team to maintain or improve biodiversity values during the operational and post-closure phases, and to determine risks and opportunities before extraction begins. The process for developing a BMP should focus on identifying, evaluating, conserving (and if possible enhancing) the relevant aspects of biodiversity, and should serve to:

- Avoid or mitigate biodiversity loss, with the objective of maintaining the diversity of species, habitats and ecosystems and the integrity of ecological functions
- Contribute towards the remediation of significant global, regional and local biodiversity losses caused by expanding human economic activities worldwide
- Realise the business opportunities that arise from biodiversity management. Examples may be:
  - (i) **operational** (e.g. increased efficiency if less water is required, for example, or lower impacts of company operations on the local environment, therefore fewer stakeholder concerns);
  - (ii) **regulatory or legal** (e.g. granting of licence to expand or development of products that meet new regulations);
  - (iii) **reputational** (e.g. improved or differentiated brand);
  - (iv) **market or product-based** opportunities (e.g. new products or services, markets for certified products or markets for ecosystem services) or
  - (v) **financial** (e.g. attracting the attention of socially responsible investment funds, improved credit quality and more favourable lending conditions).

  (See *Corporate Ecosystem Services Review 2.0* for further information).
- Respect the mitigation hierarchy
- Address any biodiversity risks identified through an environmental and social impact assessment (ESIA) (see section 4.2)
- Respond to regulatory requirements: Regulation and legislation that are relevant to BMPs relate to invasive species, protected species, protected habitats, nature conservation, treatment of wildlife, waste management, pollution prevention and water management. These vary geographically and should be thoroughly reviewed prior to incorporation into a BMP. Although BMPs should always abide by such local and national regulations, companies are strongly encouraged to reach further in their biodiversity management activities to strive for global best practice rather than complying with basic requirements alone.

BMP: One of three key, related documents

Typically, an environmental and social impact assessment (ESIA) is an essential precursor to any operations at a site. For most countries, an ESIA is a legal requirement for all new developments and major operational changes at a site. The key purpose, outcomes and requirements for an ESIA are summarised in table 1 below. Further information on the development of an ESIA is available in the CSI *ESIA Guidelines*. See also Chapter 5 of the IUCN's Integrated Biodiversity Management System (IBMS).
A BMP (sometimes referred to as a biodiversity action plan – BAP) and a rehabilitation plan are complementary and should dovetail with each other because the same biodiversity components will require particular focus. The requirement for a rehabilitation plan or a BMP depends on the sensitivity of the site; in other words the 'Biodiversity Importance Category' as defined in chapter 4 of the IBMS. Some sites will require a standard rehabilitation plan, but sites richer in biodiversity will require a comprehensive BMP, as further explained under Stage 4a of section 5 of this document.

All three of these documents form part of the site's environmental management system (EMS). The EMS is the overall management system which addresses organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy. Biodiversity risks and impacts, as well as biodiversity targets, actions and monitoring identified through the BMP process should feature in the site's EMS. Ideally a site's EMS should also be ISO 14001 certified.

Key biodiversity management principles for BMPs

In contrast to rehabilitation plans, where primary objectives are to leave the site safe and stable for future land use which may relate to non-biodiversity values, BMPs by definition give priority to biodiversity-led targets, with other forms of land use being subsidiary considerations (i.e. not jeopardizing biodiversity conservation). To ensure the attainment of identified biodiversity objectives and outcomes, the following key principles should be adhered to:

- Targets should be 'SMART' i.e. specific, measurable, attainable, relevant and time-bound
- The biodiversity mitigation and enhancement measures of a BMP should be based on defined objectives and measurable targets
- Biodiversity targets should relate to national or local BMPs where they exist
- The principal actions required to reach each of the biodiversity targets should be defined
- The outcome of these actions should be monitored by creating a monitoring programme adapted to the BMP; management actions should be adapted based on the monitoring results
- The long-term sustainability of the biodiversity management should be ensured through appropriate partnerships, resourcing and engagement of stakeholders
- The BMP should be aligned with the site's rehabilitation plan, environmental management system (where applicable) and mining plan
- The development and implementation of BMPs could also result in various social opportunities and promote sustainable socio-economic activities, such as biodiversity-based micro-enterprise development.

Table 1 Summary of the purpose, outcomes and data requirements of: (i) ESIA, (ii) rehabilitation plan, (iii) BMP (Derived from IUCN IBMS, Chapter 5 and Chapter 6)

	ESIA	Rehabilitation plan	BMP
Purpose	• To provide a process for evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human health impacts. Undertaken with rigorous scientific analysis and stakeholder engagement	• To specify the actions required to satisfy regulatory, biodiversity conservation and community requirements for the rehabilitation of the impacted part of a site	• To set out actions needed on an on-going basis to preserve/increase nature/ biodiversity value and ecosystem services during and after the completion of the extraction activities • To monitor the outcome of specified actions
Main outcomes (examples)	• Predict impacts on biodiversity over different phases of the project • Collate baseline biodiversity information and conduct targeted biodiversity inventories where such information is missing • Predict impacts on biodiversity over different phases of the project	• Set rehabilitation and if necessary, biodiversity targets (see BMP decision tree) • Ensure regulatory requirements are met • Establish appropriate and desired post-closure land use and management based on stakeholder consultation	• Set targets and related actions to maintain or improve biodiversity values • Maximise opportunities for enhancing biodiversity and ecosystems services as a contribution towards the remediation of significant global, regional and local biodiversity losses
Minimum data requirements	• Maps of ecosystems and habitats of site and immediate environs • Species list for higher plants and vertebrates • Information on seasonal use of site by species	• Subject to biodiversity sensitivity at the site i.e. a sensitive site will require a detailed quantitative and qualitative information on all ecosystems and/or species to be targeted by biodiversity management actions. For sites with lower biodiversity value, a BMP may not be required (see BMP decision tree)	
Applicable site life-cycle phase	• Planning & development phase (may be months or years in duration)	• Operational/extraction phase • Site closure phase	• Operational/extraction phase • Site closure phase

The development of a BMP takes place in stages and requires consultation with a team consisting, as a minimum, of the person in charge of the extraction site and an ecologist (in-house or consultant).

In the development of a BMP, it is recommended to work with expert partners to help define the appropriate targets and actions. The stages in the development of a BMP are summarised below and detailed in the sections that follow.

Stage 1	**Investigate** existing background data & context
Stage 2	**Field investigations** (habitat types, target species) Establish a biodiversity baseline
Stage 3	Undertake **stakeholder engagement**
Stage 4	a. Determine **priority species and habitats, ecosystems**, based on field investigations & stakeholder consultation b. Define **biodiversity targets and related actions** c. Create **monitoring programmes** to assess progress and management effectiveness
Stage 5	Produce a BMP document for the site, approved by management
Stage 6	Review, adapt actions, communicate and report

Pre-requirement for developing a BMP: Existing knowledge & the case for action

Aspect	Question/ consider	Actions	Further information	Done?
The groundwork	1. Are you familiar with the basic principles of biodiversity management?	• Cross-check planned actions with principles (see page 7) • Refer to IUCN key recommendations	• Key biodiversity management principles for BMPs (see below) • *CBD Principles for an ecosystem approach* • *Holcim-IUCN Biodiversity Management system,* p. 4-6 • *Promotion of biodiversity at the mineral extraction sites of HeidelbergCement* • *The Cemex approach to biodiversity conservation*	☐
The business case for action	2. Why should biodiversity be protected at your sites?	• Understand potential business risks and opportunities	• *ICMM Good Practice Guidance for Mining and Biodiversity,* Table 5.2, p. 10-11 • *Corporate Ecosystem Services Review (WBCSD, WRI & Meridian Institute)* • *Working with nature: Biodiversity Guidance for Lafarge sites* • *Holcim-IUCN Biodiversity Management system,* p. 11	☐
Starting the process	3. How familiar are you with biodiversity management in your industry?	• Review the literature published by other companies • Undertake some biodiversity and ecosystems training • Make site visits to learn about the on-ground management scenarios	• *Holcim, Lafarge, HeidelbergCement* • *WBCSD Biodiversity and Ecosystems Training,* BET. Section 1, Context • Review *case studies* demonstrating company action on biodiversity	☐
Legal requirements & regulation	4. What are your legislative and regulatory responsibilities regarding managing impacts on biodiversity?	• Consult national/ regional and corporate biodiversity policy and environmental regulations	• National legislation for wildlife protection (where applicable) • *CBD Aichi Biodiversity Targets* • *National Biodiversity Strategy and Action Plans* • *e.g. Summary of Government legislation for the UK*	☐

For those reading a printed version of this document, a full list of all references may be accessed at www.wbcsdcement.org/BMP-reference

Stage 1

Investigate the existing background data and context

Stage 1 connects with and builds on seeking knowledge on biodiversity management referred to above. This stage should include an enquiry to identify if existing background data relevant to the site already exists – perhaps from the data collection process for the ESIA, for example. This can be a desktop exercise or may require the engagement of a consultant to compile information relevant to the location. The box below provides some examples of where relevant details may be obtained.

The Integrated Biodiversity Assessment Tool (IBAT), may provide a useful basis for which to filter out or make a first analysis of the biodiversity sensitivity of the site, though additional information is required to make a thorough biodiversity assessment of the site. It can take time to collect the necessary data to develop a comprehensive and functional BMP. Appropriate allocation of time and resources to do this, and also to evaluate and utilise the data, will result in a BMP that is well supported by science and will lead to real, measurable outcomes.

Furthermore, it is of paramount importance to understand the landscape context of the site. For example, it may provide a linkage in a mosaic, or patchwork, of habitats across the landscape that are rich in biodiversity, or it may provide an essential nesting or feeding location for a variety of species in the region. For this reason, it is always important to look for biodiversity management references relevant to the adjacent or proximate region, the broader landscape, or at the country/national level. The BMP should align with the objectives of such plans or strategies.

Examples of where relevant details may be obtained

- Aerial photographs of the extraction site (as current as possible)
- Topographic map (current) of the extraction site and the surrounding area
- Land use description
- Survey data/maps, showing today's extent of the extraction site, e.g. current ribside, steep slopes, depth of stopping levels, etc.
- Survey data/maps, showing how the extraction site will develop in the future, e.g. extension of the quarry, ribside in future, depth of stopping levels, etc.
- Geological data – e.g. type of bedrock and associated soil classification (lime-/marlstone, etc.) and related locations inside the extraction site
- Biological data – all information about species, habitats, ecosystems, etc. inside and outside the extraction site; maps, species inventories, etc.
- Restoration plans, including habitat creation steps and target habitats, etc.
- Biodiversity projects, scientific reports, historical surveys and data, and information about current projects in the field of biodiversity
- Other existing regional or national BMPs covering the extraction site or adjacent areas.
- Background information about the extraction site, e.g. special local history or ancient tradition
- Legal compliance requirements
- Local, regional or national biodiversity management strategies or plans, i.e. landscape level plans for developing habitat corridors (green infrastructure) or specific and/or existing approaches to conservation of a particular species or ecosystem, e.g. national biodiversity strategies and action plans (NBSAPs)

Case study 1 Conserving internationally recognised Important Bird & Biodiversity Areas through BMP planning

Through a global partnership with BirdLife International, a collaboration with the Malaysian Nature Society (the BirdLife Partner in Malaysia) has led to the development of a biodiversity action plan (BAP) for the Bukit Tambun Quarry. The BirdLife Partner collated information about birds and other selected biodiversity inside and outside the extraction site. The partnership developed a novel method to inform priority setting for bird species.

All the sites that were assessed were given a score. These scores were used to determine the most suitable site for the partnership to focus on in the next phase in order to have an overall positive impact on biodiversity, given the probable limitations to achieving on-site biodiversity gains. The most important site was

Photo credit: David Bakewell, Malaysian Nature Society

identified as the Teluk Air Tawar Kuala Muda coast, a site designated an Important Bird & Biodiversity Area (IBA) by BirdLife International, and part of a network of IBAs around the world. The next steps to be taken with the BAP are to raise the public profile of the IBA, to seek to strengthen its legal protection and explore ways to showcase its biodiversity values in ways that enhance its long-term sustainability.

Stage 2

Field investigations

The variables that determine the overall sensitivity, significance or vulnerability of a particular site or region vary considerably and, accordingly, different management approaches are required. This guidance document does not seek to define high, medium or low biodiversity sensitivity, but instead points to a range of resources that will enable the reader to determine this.

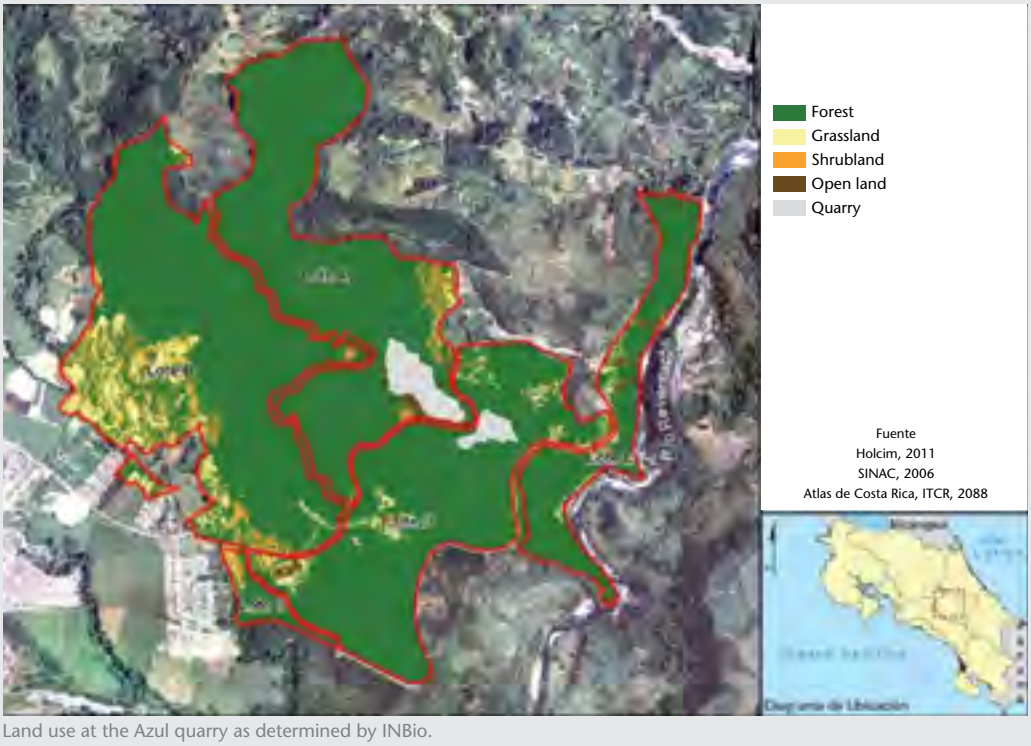
Note that an increasing number of tools exist that have been developed to help business understand the biodiversity and the implications for their operations. Many of these tools are explained in the WBCSD's *Eco4Biz* document.

When recording data at an active quarry, note that this baseline data will not allow a full comparative evaluation of before and after biodiversity management activities. In some cases, however, an assessment may be made using data from surrounding areas that may feature similar ecological characteristics as the site prior to quarrying.

Case study 2 Field investigations to determine biodiversity priorities and actions

A partnership was established in Costa Rica between the cement company and the National Biodiversity Institute – INBio, local biodiversity research organisation to carry out two studies (dry and wet season) at its cement quarries to establish the biodiversity importance and impacts. Each investigation consisted of three days of field work to collect information on key flora and fauna, using different methodologies for each taxonomic group. The study also included evaluation of the quality of different ecosystems and habitats.

With this information, the company and research organisation, together with other stakeholders, worked to determine the goal and objective of its BAPs.



Land use at the Azul quarry as determined by INBio.

Aspect	Question/ consider	Actions	Further information	Done?
Site significance	1. How important is biodiversity at your site, i.e. How much protection does the site require? 2. Are there any threatened species on your site? 3. Are there any important ecosystems or threatened species on your site? Are you aware of specific management requirements of this habitat type?	• Identify appropriate criteria for evaluating biodiversity, e.g. species/habitat richness, species endemism, keystone species, rarity, size of habitat, population size, fragility, ecosystem service provision • Commission a biodiversity survey to establish baseline data and determine level of biodiversity significance: (high/ medium/low) • Refer to existing studies conducted on the site; see also ESIAs • Undertake biodiversity screening	• *IUCN-UNEP Protected Planet* (global database on Protected Areas) • *UNEP – WCMC Critical Site Network* • *Biodiversity Hotspots,* e.g. the biodiversity layer in the *WBCSD's Global Water Tool* (uses data from The Nature Conservancy) • *Key Biodiversity Areas* (IUCN) • *IUCN Red List of Threatened Species* • *IBAT biodiversity screening tool;* see also *CSI Guidelines for using IBAT* (CSI Members) • *ICMM Good Practice Guidance for Mining and Biodiversity*, 2006, p. 60 • *WBCSD – WRI Corporate Ecosystem Services Review* • *Working with nature: Biodiversity Guidance for Lafarge sites,* p. 15-16 • *Promotion of biodiversity at the mineral extraction sites of HeidelbergCement,* p. 71	☐
Impact of operations	4. How do operations affect biodiversity impacts?	• Consider: (i) type of operations, e.g. quarry or ready-mix (ii) stage in quarry life cycle (iii) biodiversity significance at site	• *Working with nature: Biodiversity Guidance for Lafarge sites,* p. 13 • *ICMM Good Practice Guidance for Mining and Biodiversity,* section B, p.22 and table 5.2, p.67	☐
Biodiversity risks	5. What are biodiversity risks and opportunities?	• Identify and categorise all the threats posed to biodiversity, direct and indirect, so that action can be prioritised • Consider how biodiversity management may enhance the environment – consider ecosystem services that may be delivered	• *IUCN Integrated Biodiversity Management System,* Chapter 5	☐

For those reading a printed version of this document, a full list of all references may be accessed at www.wbcsdcement.org/BMP-reference

Stage 3

Undertake stakeholder engagement

Aspect	Question/ consider	Actions	Further information	Done?
Seek knowledge	1. Have you consulted biodiversity experts?	• Prior to taking any action, seek advice of ecologists on expected biodiversity impacts, options for enhancement and setting of specific targets	• Local or regional NGOs • Scientists/academic institutions • Consultant ecologists	☐
	2. Have you identified who are your stakeholders?	• Consider who may (i) have relevant local knowledge, (ii) be affected by or interested in quarrying activities, (iii) bring additional capacity or legitimacy to the project	• *Stakeholder Engagement,* IFC 2007 • *ICMM Good Practice Guidance for Mining and Biodiversity,* p. 80	☐
	3. How will you engage with these stakeholders?	• Involve local stakeholders prior to decisions or actions. The engagement process itself will depend on site size, type and location, and also the stakeholder experience and background • Allocate sufficient time and funding for a full and fair consultation process	• *Stakeholder Engagement,* IFC 2007 • *ICMM Good Practice Guidance for Mining and Biodiversity,* p. 80 • *CSI Quarry Rehabilitation Guidelines,* 2012, p. 6	☐
	4. Have you determined how the views of stakeholders of the quarrying activities can be accommodated in biodiversity management planning?	• The method for capturing feedback will vary depending on the stakeholders but may include focus groups, written feedback, public meetings, advisory panels and interviews • Be sure to manage expectations, particularly where there are conflicting views	• *Stakeholder Engagement,* IFC 2007 • *IFC Performance Standards on Environmental and Social Sustainability,* 2012	☐
	5. What can you learn from other sites or local operators?	• Prior to decisions or actions, allocate time to engage in formal or informal dialogue and partnership in order to maximise benefits of shared experience	• *Working with nature: Biodiversity Guidance for Lafarge sites*, p. 35 • *Promotion of biodiversity at the mineral extraction sites of HeidelbergCement,* p. 75	☐

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Case study 3 Best practice in biodiversity management and stakeholder engagement

The Racos Quarry area is located in the Persani Mountains in Romania. Historically the site was used as an aggregates quarry since 1890. Through quarrying activities, one of the youngest volcanic structures in the Carpathians was identified; through restoration, new emergent biodiversity has been established. In 2011, a partnership with Geopark Persani, the custodian NGO for this area, was initiated to raise awareness of the diversity of this area and the importance of the biodiversity and geodiversity. One of the main objectives of the project was to develop and implement a monitoring plan for ecological restoration including biodiversity management and monitoring. In the development of these plans the IUCN Red List was used to identified species of predatory birds which are using the new habitat. The BMP was drafted in partnership with Geopark Persani and specialists from the Faculty of Ecology and Faculty of Silviculture (Forestry). The draft BMP was presented at a meeting with local stakeholders which included the local authorities, representatives of local environmental agencies, the agency for mineral resources, land owners, scientists, and representatives of local NGOs. Following their feedback a final BMP was agreed.

Stage 4a

Determine priority species, habitats and ecosystems

As explained in the *IUCN's Integrated Biodiversity Management System (IBMS)*, the level of biodiversity management required during the operational phase can be minimum, medium or high, based on the site's biodiversity risk (see Figure 1, page 18). All quarry sites can therefore contribute to biodiversity and companies can set criteria for each level. Each of these three levels requires progressively higher inputs for biodiversity management, as summarised below:

Aspect	Question/consider	Actions	Further information	Done?
Assess priorities	1. What are the key elements of biodiversity at the site that warrant protection? 2. What are greatest risks posed to biodiversity? 3. What will have the most severe impacts if management action is not taken? 4. Relative to investment, which measures will have the greatest positive impact on biodiversity?	• Use a risk-based approach to determine priorities: - Estimate biodiversity impact levels based on likelihood of impact and mitigation potential - Estimate the level of biodiversity risk by combining biodiversity significance/ importance with expected impact level	• *IUCN Integrated Biodiversity Management System,* Chapter 4 • *Risk Matrix, Holcim-IUCN Biodiversity Management system,* p. 30 • *IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources,* 2012	☐
	5. What is the level of habitat fragmentation?	• Minimise or avoid habitat damage and fragmentation • Minimise/avoid species mortality and stress	• *Working with nature: Biodiversity Guidance for Lafarge sites,* p. 21-22 • *Good Practice Guidance for Mining and Biodiversity,* ICMM	☐
	6. Are there any invasive/ exotic species on your sites?	• Remove and control invasive exotic species	• *Global Invasive Species Database* • *Case study: Baltimore cement terminal. Working with nature: Biodiversity Guidance for Lafarge sites,* p. 19	☐

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Figure 1 Three levels of biodiversity management inputs with indicative actions for each level

Levels of Biodiversity Management (Inputs)

Minimum biodiversity input: standard rehabilitation plan

- Revegetation using non-invasive alien species or native species
- Active control of invasive alien species
- No biodiversity monitoring
- Ultimate land use not primarily geared at biodiversity or depending on biodiversity (e.g. residential/industrial)

Medium biodiversity input: rehabilitation plan with biodiversity targets

- May include biodiversity targets (together with targets for other forms of land use)
- Revegetation using only native species
- Active control of invasive alien species
- No biodiversity monitoring (except presence/absence of invasive alien species)
- Ultimate land use based on a natural resource base/biodiversity (forestry, grazing, etc.) with due cognizance of the land-use patterns in the broader landscape

High biodiversity input: separate BMP

- Specific positive biodiversity targets
- Revegetation using only native species
- Active control of invasive alien species
- Long-term post-closure management for biodiversity-related land use
- Active monitoring of target attainment
- Ultimate land use for conservation (taking into account land-use patterns in the broader landscape) or for natural resource use/biodiversity (forestry, grazing, etc.)

Case study 4 From biodiversity baseline assessment to an integrated BMP, Bulgaria

Since the designation of one portion of the Zlatna Panega quarry as a protected area – part of a larger Natura 2000 site – in 2007, steps were taken to develop an integrated BMP for the site. Based on an initial ecological scoping study that included desk and field investigations, and following consultations with and the engagement of stakeholders, priority species and habitats were identified and biodiversity targets and objectives were determined. The BMP outlines the key rehabilitation and biodiversity activities that are applied in the current extraction site as well as the expansion areas. It also sets targets and monitoring mechanisms, and overall integrates biodiversity into the plant's environmental management system. Biodiversity actions include: conservation of protected flora species through relocation and replantation, the development of a nursery with plants of native and local provenance, reclamation of depleted quarry areas with the target to preserve and even enhance biodiversity values during and after the completion of the extraction activities.

Orphrys scolopax ssp. *cornuta* (Bee orchid)

Stage 4b

Define biodiversity targets and related actions

To maintain or improve the biodiversity values and ecosystem services at the site (i.e. to have a net positive impact), targets may be grouped as follows, though given the interconnected nature of ecosystems, measures to enhance one aspect of biodiversity are likely to positively affect others. For example, the enhancement of a habitat condition may lead to increases in the populations of certain native fauna.

An important point relevant to target-setting for biodiversity management relates to cost. While companies are strongly encouraged to adopt ambitious targets that demonstrate best practice and leadership, it is acknowledged that any work plan adopted must be well-financed in order to succeed. The cost of management interventions will vary greatly depending on the scale and location of the project. Cost estimates should be sought before work commences, as well as advice on how to secure and manage the necessary funding to support the work.

Figure 2 Example of how targets may be grouped, based on (i) priority ecosystems, (ii) priority species, (iii) processes & flux and (iv) ecosystem services

Targets for priority ecosystems (examples)

- Maintain extent – No reduction in size
- Achieve condition – Maintain and/or improve the condition of the existing ecosystem
- Restoration – Improve the condition of derelict or degraded ecosystems
- Expansion – Increase the extent

Targets for priority species (examples)

- Range – Maintain or increase range compared to range in reference year or at start of monitoring
- Population size – Maintain or increase population size compared to levels in reference year or at start of monitoring

Targets for processes & flux (examples)

- Variation – Maintain current variation in, for example, fire; meaning avoid imposing anthropogenic management cycles on naturally stochastic patterns

Targets for ecosystem services (examples)

- Restoration/creation – of existing or new ecosystem services. See: *Corporate Ecosystem Services Review*

Aspect	Question/ consider	Actions	Further information	Done?
Set targets	1. What is the overall level of ambition for biodiversity protection?	• Apply the mitigation hierarchy when setting your targets • Aim for net positive impact, i.e. to minimise the impacts of operations and actually contribute to overall biodiversity levels	• *IUCN Integrated Biodiversity Management System,* Chapter 3	☐
	2. What are the issue-specific achievable, impactful and measurable targets?	• Aim to achieve a range of targets. These will depend on the character of the site, the type and stage of operations, and the local biodiversity present at the site • Targets should be determined in consultation with an appropriately qualified and experienced person (specialist) • Ensure that targets align with the well-known SMART criteria (specific, measurable, attainable, relevant and time-bound) • Targets identified need to be closely related to priority species, habitats and ecosystems	• *The Cemex approach to biodiversity conservation* • *Promotion of biodiversity at the mineral extraction sites of HeidelbergCement* • *Working with nature: Biodiversity Guidance for Lafarge sites,* p. 14-28	☐
Identifying barriers	3. What are the possible obstacles that may prevent management action?	• Identify solutions that address barriers relating to e.g.: (i) health & safety, (ii) other possible land use, (iii) budget constraints (see below), (iv) biodiversity regulations. See also Stage 2 (v) Biodiversity skills/ knowledge shortages	• *Working with nature: Biodiversity Guidance for Lafarge sites,* p. 11 • *WBCSD Biodiversity and Ecosystems Training (BET) programme*	☐
Allocate funding	4. What is affordable? Has the budget been allocated?	• Ensure that there is sufficient funding for all aspects of the intended work. Where necessary seek advice on cost estimates and allocate additional budget to ensure work can be delivered to a high standard without interruption	• *Working with nature: Biodiversity Guidance for Lafarge sites,* p. 11-13	
Define actions	5. How can impacts be avoided or reduced, i.e. what action is required?	• Identify possible mitigation measures	• Section 5.2 *IUCN Integrated Biodiversity Management System*	☐
Implement	6. Is there a process for ensuring that actions are being undertaken to ensure progress towards targets?	• Once the BMP has been finalised, spell out what the agreed specific actions are, when they should be undertaken, how frequently and by whom. Develop a template to detail and track the work to be done	• See *Template 2* as an example of how specific actions can be identified and scheduled at the site level	☐

For those reading a printed version of this document, a full list of all references may be accessed at www.wbcsdcement.org/BMP-reference

Using the Mitigation Hierarchy

The mitigation hierarchy provides a structured biodiversity management approach for avoiding unacceptable impacts, minimizing and reducing the impacts that do occur, restoring areas that are impacted, and off-setting the residual impacts of biodiversity (and implementing additional voluntary projects in some cases). The hierarchy helps to frame impacts and allows the setting of targets in a way that promotes good practice and ensures optimal biodiversity protection within an operational context. For the cement sector, rehabilitation to restore biodiversity is the ultimate goal, because when implemented correctly, it can result in overall eventual enhancement of biodiversity. Only when this is not possible should the concept of offsets be considered for any long-term disturbance of biodiversity on a site, which should then be based on solid scientific grounds and on a case by case basis. Each of the mitigation steps in the hierarchy are summarised as follows:

- Avoidance: Requires measures to avoid creating impacts from the outset, such as careful spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts on certain components of biodiversity
- Minimisation: Requires measures to reduce the duration, intensity and/or extent of impacts (including direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible
- Rehabilitation/restoration: Requires measures to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/or minimised
- Offset: Involves measures to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and/or rehabilitated or restored in order to achieve no net loss or a net gain in biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded ecosystems, arrested degradation or averted risk, protecting areas where there is imminent or projected loss of biodiversity.

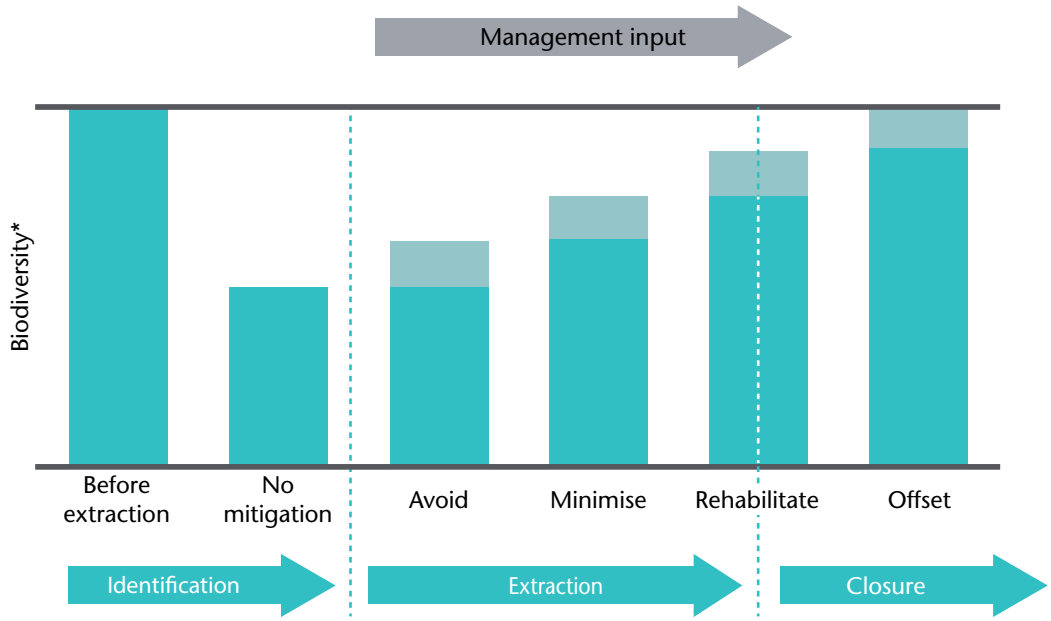
The hierarchy may be visualised as follows, where the pale green portions of the columns represent the additional biodiversity benefit compared to the previous step in the hierarchy. Figure 3a below shows the situation where management actions achieve no net loss; Figure 3b illustrates a scenario where there is a net positive impact. These are terms increasingly used by large companies with major land holdings to describe their policies to address broad targets for biodiversity management. The management implications associated with each of these mitigation hierarchy steps (broad targets) may be summarised as follows:

Table 2 Typical management implications associated with each of the four mitigation hierarchy steps

Mitigation hierarchy step (broad target)	Summary of action required
Avoid	Exclude area from extraction or disturbance
Minimise	Partially avoid/reduce area of extraction or disturbance
Rehabilitate	Recreate, restore or enhance ecosystems
Offset	Protect biodiversity-rich areas offsite

Some global regions have been subject to cultivation or human development for a long time, as is the case of many parts of Europe. In such situations, restoration provides a real opportunity to create habitat that is far superior from a biodiversity perspective, compared to what the land was like prior to quarrying, or indeed compared to the surrounding landscape. Restoration therefore provides an opportunity to create, improve or enlarge high-quality habitat, to establish wildlife refuges, and to build 'stepping-stones' of habitat for biodiversity within the wider environment. Therefore, when setting biodiversity targets based on the mitigation hierarchy, the broader landscape context and land use history should be taken into account and ambitious restoration targets set that may result in net positive impact, even without offsets.

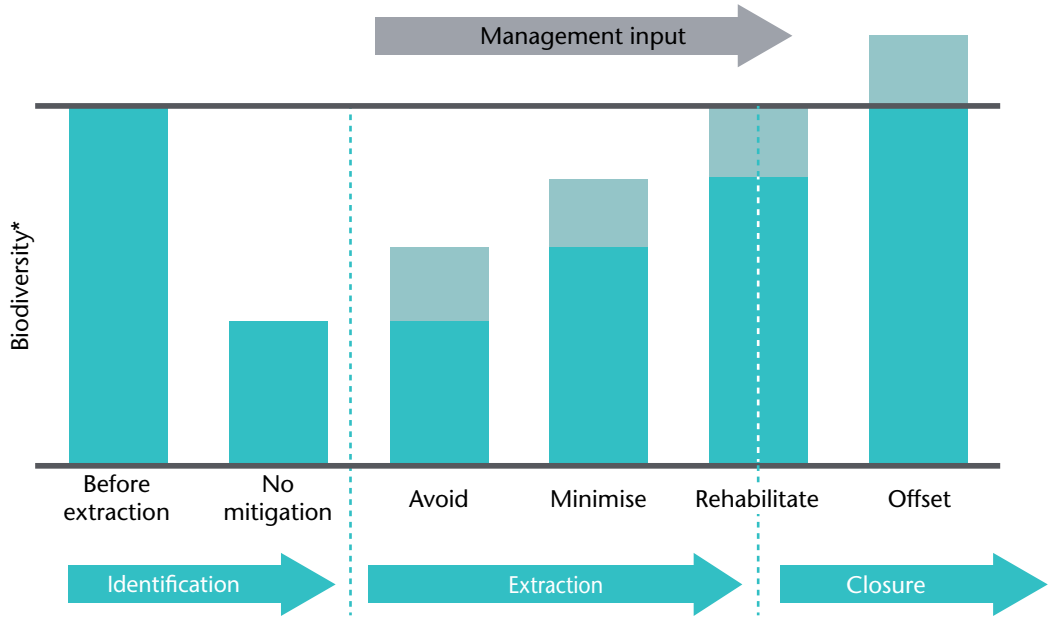
Figure 3a The mitigation hierarchy showing the connection between biodiversity ambition/target, management input, and level of biodiversity leading to no net loss



*Advice should be sought as to how biodiversity is measured, e.g. species richness, habitat area, etc.

Connection to site life cycle phase is also shown in this figure. This example demonstrates how a combination of management input at the site and offsets can lead no net loss. Derived from *UEPG Position Paper on Ecological Offsets*.

Figure 3b The mitigation hierarchy showing the connection between biodiversity ambition/target, management input, and level of biodiversity leading to net positive impact



Connection to site life cycle phase is also shown. This example demonstrates how a combination of management input at the site and offsets can lead net positive impact. Derived from *UEPG Position Paper on Ecological Offsets.*

Important Note on the Mitigation Hierarchy, No Net Loss and Net Positive Impact

The figures shown above represent a simplified explanation only, and some important points should be understood when using the terms no net loss and net positive impact. Achieving either no net loss or net positive impact depends on the condition of the site prior to quarrying. For the terms to be applied appropriately, there is a need to clearly understand the pre-extraction biodiversity levels (see Stage 2) because these will determine whether no net loss or net positive impact is actually achievable at that site. For example, if the pre-extraction situation is a pristine natural area net positive impact is unlikely to be achieved. Conversely, if the pre-extraction scenario is a highly degraded landscape, then net positive impact may be possible with rehabilitation alone. These two scenarios highlight how understanding the pre-extraction situation can have a qualitative impact on proposed or actual management outcomes.

Case study 5 Offset measures to promote and enhance biodiversity, USA

While planning the expansion of the Roanoke Limestone Quarry, the cement company discovered that approximately 0.4 hectares of wetlands and 1,279 metres of intermittent streams would be subjected to unavoidable impacts. In order to expand the quarry and continue operations it was required to have a mitigation plan in place. Mitigation methods included purchasing stream credits from a reputable stream bank or providing off-site mitigation. Being a corporate citizen of the Catawba Valley for over 60 years and continuously striving for the betterment of the facility and the surrounding area, the cement company strongly believed that any impacts on local resources should be mitigated locally by improving their community.

Recognizing the need for improvement of local water resources, 39.6 hectares were allotted for the enhancement and preservation of biodiversity along more than two miles of Catawba Creek which flows through the plant's property. To date, the company has introduced cattle exclusion fencing, localsed stream bank grading to the original contour, eradicated invasive species, and planted native grasses. More than 16,000 trees will be planted to promote habitat quality. Once established, this preservation area will serve as the basis for a more diverse structural habitat which will provide food, water, shelter and breeding sites for birds, mammals, amphibians and reptiles.

Stage 4c

Monitor and evaluate

A BMP should specify the actions needed to protect or enhance biodiversity during and after the extraction phase. Without any monitoring system in place, however, it is impossible to assess whether the BMP is serving its purpose, and what, if anything, needs to be adjusted so that biodiversity targets can be reached. When developing the BMP, careful thought should be given as to which data should be collected, how, and for what purpose.

Note that owing the natural spatial and temporal variability of ecological systems, and the complexity of the inter-relationships of ecosystem components as well as factors such as weather and seasonality, it can take time to determine clear patterns and trends in any direction. Below, some checks are outlined, along with some preliminary suggestions on how to respond.

Aspect	Question/ consider	Actions	Further information	Done?
Monitoring and evaluation: Biodiversity outcomes and management effectiveness	1. Is there sufficient baseline data to allow measurement of progress against targets?	• Compile all the relevant site details and datasets to allow later comparison & analysis	• See Stages 1 & 2 above	☐
	2. How will input/ effort into biodiversity management be recorded?	• Ensure that time and resources invested in biodiversity management projects are documented	For example: • *CSI KPIs* • *ICMM Good Practice Guidance for Mining and Biodiversity,* p. 71 • *Promotion of biodiversity at the mineral extraction sites of HeidelbergCement,* p. 72 • *UNEP – WCMC information on biodiversity indicators*	☐
	3. What exactly are the management questions that you need to answer? 4. What data will you need to meet reporting requirements?	• Identify some biodiversity indicators and metrics in consultation with biodiversity expert(s) that will enable you do evaluate (i) biodiversity assets, i.e. the value of landholdings and the management effort invested, (ii) management performance, i.e. biodiversity condition of sites, (iii) biodiversity outcomes, i.e. progress with respect to defined targets		☐
	5. What methods will you use to monitor your progress towards your biodiversity targets?	• Seek an ecologist's advice on an appropriate monitoring regime to capture the required data (e.g. methods, frequency, units)		☐
	6. Has biodiversity improved since management intervention? If so, in what way and by how much?	• Collect sufficient data to make a meaningful evaluation. Then, using indicators selected, carry out a quantitative assessment using data analysis and comparison to establish the biodiversity trends since management began	• *IUCN Integrated Biodiversity Management System*	☐

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Case study 6 Promoting fauna diversity and abundance: Implementation of management actions and monitoring

Quarry rehabilitation often centres on the revegetation of degraded areas with less concern given to resident faunal communities. However, fauna plays an important role in ecosystems, providing several services that improve rehabilitation, like seed dispersal. In 2007, the cement company partnered with the University of Évora to characterise and increase fauna diversity and abundance at a plant located in Arrábida Natural Park. The baseline data was used to define a BAP for fauna recovery integrated with the Landscape Rehabilitation Plan, in progress since 1982. Because of the location of the quarry, BAP implementation is extremely relevant to the integration of site biodiversity with the adjacent faunal context.

The strategy of the BAP is based on an adaptive management programme, with periodic monitoring of fauna and continuous evaluation of the effectiveness of

Pipistrellus spp. Credit: Denis Medinas

the proposed actions, like providing artificial shelters and increasing water availability. This allows for the comparison of current fauna diversity and abundance with the 2007 reference level and it also allows trends to be tracked over time. Only long-term monitoring will enable the evaluation of the real success of the BAP in order to change actions that are not suitable and promote the ones with positive effects.

Case study 7 The floristic diversity in the San Giuseppe di Basovizza quarry, Trieste

San Giuseppe de Basovizza Quarry

The San Giuseppe quarry is located within an area of high biodiversity value named Bosco Bazzoni, which makes up part of a site of community interest (*Sito di Interesse Comunitario*, SIC). This study sought to measure the levels of biodiversity within an active quarry, a part of which has already been the subject of environmental recovery. The long life of the quarry has resulted in highly differentiated zones in terms of the ranking of environmental recovery actions. Some date back some thirty years, while others located at the edge of active areas have yet to be recovered.

Environmental remediation measures have been implemented gradually throughout the life of the site. Therefore, for each portion of the quarry, restoration was carried out as the mining activities were completed in order to minimise the duration for which the soil was exposed. Another objective was to compare the level of biodiversity inside the quarry after best-practice environmental recovery measures with that of the external areas in order to understand the final impact on the ecosystem at the end of the quarry production cycle.

Data collected from monitoring programmes show that the areas of the quarry where environmental recovery was carried out have a level of floristic biodiversity the same as or higher than the external areas. This outcome is particularly interesting given the rich natural environment in which the production site is located.

Stage 5

Writing the BMP

Stages 1 to 4 above outline the context, required data, necessary consultation and possible approaches to writing a BMP. This section provides some practical advice on writing the BMP, once these four preceding preparatory stages have been completed.

Aspect	Question/consider	Actions	Further information	Done?
Preparing the document	How will you structure BMP? What will it cover/ address?	• Ensure the BMP is fit-for-purpose, i.e. covers the key issues and is tailored and relevant to the site for which is was developed	• Suggested structure outline below	☐
	What are your information needs? What information do you already possess and what is required?	• Seek professional advice to obtain reliable, current quantitative data	• Suggested background data list on page 11	☐

What should a BMP look like?

There is no standard template for a BMP because the issues it needs to address are determined by the location, the biodiversity values at the site, and the nature of the company operations. However, in order to give some indication of possible BMP structure, sequence and headings, an outline is provided on page 27.

A range of practical tools that support the development of a BMP exists. One such example is the *Integrated Biodiversity Assessment Tool (IBAT)*. It is intended for use by private sector users to support fine scale risk assessment by providing the location of sensitive sites at the global and national level, leveraging worldwide biodiversity databases. Such assessment is a critical first step in the project planning process. Geographic information system (GIS) mapping can also provide valuable information when planning for biodiversity management. A range of tools exists, many of which are described in the WBCSD's *Eco4Biz* tool mapping resource. All BMPs require an accompanying action plan to detail and schedule the specific activities required to meet the targets identified in the BMP. *Template 1* and *Template 2*, based on a model used by Lafarge, provide a way in which such actions can be identified, clarified and presented for each site. The BMP development process will identify biodiversity targets and actions that can be then further detailed for implementation using the action plan template.

Figure 4 Example of possible document structure for a BMP

Example BMP document structure

1. Summary
2. Methodology
3. Biodiversity context
   - a. *Basic information*
     - i. Location of the extraction site
     - ii. National to regional biodiversity context
     - iii. Additional ecological data/ecological history
     - iv. Geology and soil conditions
   - b. *Protected areas*
   - c. *Nature protection projects*
     - i. Nature protection projects
     - ii. Socio-economic projects
   - d. *Description extraction site*
     - i. General description of the ecosystem
     - ii. Biodiversity relevant physiography
     - iii. Habitats, flora and fauna
     - iv. Progressive restoration
4. Prioritise biodiversity features and components of elevated significance
5. Objectives and targets
   - a. *Develop objectives taking into account the previous valuation*
   - b. *Develop the objectives into actions, taking the mitigation hierarchy into account*
6. Actions (management)
   - a. *Actions based on legal requirements*
   - b. *Biodiversity actions*
   - c. *Identification of those responsible for their delivery*
7. Implementation
   - a. *Identify appropriate implementation mechanism for the BMP*
   - b. *Involve stakeholders and partners*
8. Monitoring and surveillance
   - a. *Review BMP progress regularly*
   - b. *Compare performance with baseline*
   - c. *Review and revise management objectives if necessary*
   - d. *Maintain communication with stakeholders*
9. Budgets and timelines
   - a. *In order to ensure successful implementation of the BMP, clear budgets and timelines need to be developed according to the defined actions, implementation requirements and monitoring needs*
10. Reporting
    - a. *Internal reporting*
    - b. *External reporting*
11. References
12. Appendix
    - a. *Maps*
    - b. *Photo documentation*

Case study 8 Writing a BMP for Longué-Jumelles Quarry in France

The BMP developed for Longué-Jumelles Quarry in France gives a good example of how a plan should be developed and what information should be included. In developing a BMP it is important to involve an NGO that has expertise in the local biodiversity. A BMP ideally should be used for the whole life cycle of the site, ideally from the site's construction and its operations to its closure and post-closure. The plan typically covers a five-year period which is then reviewed annually and updated to ensure it is a living document. The plan includes the whole consented area, neighbouring areas of land impacted by the operations, and any neighbouring areas critical to biodiversity conservation. A BMP should identify resources needed to achieve the objectives, including personnel, funding materials, local knowledge and training. The BMP is divided into three long-term objectives development and maintenance of site biodiversity; a knowledge base; and education, awareness and involvement of local stakeholders in the protection of biodiversity. Actions identified also take into account the issues related to seasonality, and it is clearly identified when these actions should be carried out.

Longué-Jumelles Quarry, France

Stage 6

Reviewing, revising and reporting on the BMP

Evaluation and adaptation are essential parts of good management practice. Stage 6, the BMP review phase, is a period after the BMP has been written and implemented, when the site team can reflect on how effectively the plan is working as a management tool. This is an opportunity not only to identify what trends are emerging and how biodiversity may be changing at the site, but also to consider how management may be optimised to ensure biodiversity targets are being reached.

Adaptive management

The review phase of the BMP will raise questions about what the BMP has achieved (or not achieved), what was learned, and what should be modified or adapted. In terms of possible modifications, options include greater investment in management resources; the establishment of more realistic targets; more thorough data collection; the elimination of confounding factors; or simply a monitoring period. The adaptation required depends on the scenario. Professional advice should be sought before making changes to the BMP. However, an adaptive management approach is not just about modifying what was done before. It is also about establishing a management plan that leads to new knowledge to improve management in the future and to achieve the best short-term outcome based on current knowledge. The review of a BMP through an adaptive management process must make sure that it addresses these two elements, i.e. that it informs about what adaptations or modifications are required to the plan itself and that it contributes to new knowledge and learning.

Reporting

Companies that report on their targets and corporate commitments, including those for biodiversity, demonstrate transparency and accountability, both of which are essential in gaining the support of customers, regulators and investors. Regardless of whether the results are positive or negative, detailed reporting of performance in biodiversity management builds faith in the company's biodiversity management standards and processes. As the leading cement and aggregates sustainability sector group, the CSI has defined key performance indicators (KPIs) that all members of the group track and report on.

The biodiversity-focused KPIs are:

- Biodiversity KPI 1: Number of active quarries within, containing or adjacent to areas designated for their high biodiversity value (number and coverage), *biodiversity value as defined by GRI EN11*
- Biodiversity KPI 2: Percentage of quarries with high biodiversity value (according to KPI 1) where biodiversity management plans are actively implemented
- Biodiversity KPI 3: Percentage of sites with community engagement plans in place

Linked to this, the CSI also has a rehabilitation KPI:

- Percentage of active quarries with quarry rehabilitation plans in place. To complement this work, the *Guidelines on Quarry Rehabilitation* have been published.

This BMP Guidance document has been developed by CSI member companies to drive and promote best practice biodiversity management. It is linked to the above KPIs embedded in the CSI Charter, which provides measurable targets to track progress. Companies report publicly on their performance with regards to the commitments taken in the CSI, as outlined in the CSI Charter. The Charter is subject to renewal as necessary to address developing issues.

Assurance

Since the first CSI Charter was signed in 2002, CSI members have agreed to begin independent third party assurance of a number of the key performance indicators (KPIs), which are publicly reported. Beginning with 2006, companies carry out assurance of their CO_2 data at least once every two years. They have also committed to independent assurance of their safety data, beginning with data from 2008. Other KPIs will be added over time and assurance requirements will evolve in tandem with these.

Aspect	Question/ consider	Actions	Further information	Done?
Adaptive management	1. Have all the fundamental principles of biodiversity management been adhered to?	• Use the list provided under Stage 1 as a check. See also citations for wider reference	• *Holcim-IUCN Biodiversity Management system,* p. 93 • *Promotion of biodiversity at the mineral extraction sites of Heidelberg Cement,* p. 13	☐
	2. Have steps been taken towards achieving the biodiversity targets?	• Review the work that has been undertaken in order to achieve the goals, then assess the overall level of resource input	• *Working with nature: Biodiversity Guidance for Lafarge sites,* Check matrix, p. 30	☐
	3. How do results compare to the baseline, i.e. are there changes in biodiversity?	• Identify if any trends can be observed; if yes, are they: (i) statistically significant, (ii) a concern that requires management action	• Salafsky, N., R. Margoluis, and K. Redford. 2001. *Adaptive management: A tool for conservation practitioners. Washington, D.C.: Biodiversity Support Program.*	☐
	4. Have biodiversity targets been reached?	• Evaluate to what degree current biodiversity indicators align with agreed targets		☐
	5. Can you tell why changes are (or are not) occurring?	• Seek advice as to the possible explanations for trends observed, i.e. determine if changes are random or a result of management activities or operations		
	6. How will you modify your management plan?	• Best practice biodiversity management is about continuous improvement; modifications may relate to the budget, the intensity or style of management, or the targets, for example (see more below)		☐
	7. What have you learned from the BMP review process?	• Document your experience so that the knowledge may be shared and applied in other situations.		
Reporting	8. What are the company reporting requirements?	• Consider internal and external reporting requirements	• *CSI KPIs* • *Global Reporting Initiative (GRI),* EN11-15 • *The IUCN Integrated biodiversity management system (IBMS),* Section 3.2	☐
	9. What should biodiversity reporting address?	• Include: (i) biodiversity assets, i.e. the value of landholdings and the management effort invested; (ii) management performance, i.e. biodiversity condition of sites; (iii) biodiversity outcomes, i.e. progress with respect to defined targets		

For those reading a printed version of this document, a full list of all references may be accessed at www.wbcsdcement.org/BMP-reference

Case study 9 A long-standing partnership with the Wildlife Habitat Council yields a comprehensive BMP

In 1996 a partnership was established with the Wildlife Habitat Council (WHC), a non-profit, non-lobbying organisation dedicated to increasing the quality and amount of wildlife habitat on corporate, private, and public lands. Since 2011, the Louisville Cement Plant has been certified by the Wildlife Habitat Council's Wildlife at Work programme for the plant's comprehensive, employee-based wildlife habitat enhancement programme. To achieve certification in 2011, the plant developed a management plan for the long-term, active management of the plant's wildlife habitat enhancement programme.

This management plan serves as a comprehensive strategy outlining the goals of the wildlife habitat programme, describing projects to achieve these goals, making provisions for monitoring projects, and presenting implementation and evaluation schedules. The management plan serves as a tool for the site's wildlife team; it provides direction and detailed information to guide the team and functions as a working document that is modified as goals change due to site conditions and in response to the implementation of projects. The site wildlife team is actively involved in reviewing, revising and reporting for the planning of future activities and to show that the projects are being actively maintained and monitored. Specifically, the plan includes a section on reviewing, revising and reporting, that is updated at least every two years prior to submitting the programme to the Wildlife Habitat Council for recertification. The management plan is written so that if a new member joins the wildlife team or a community member is interested, he or she is able to quickly understand the programme.

Photo credit: Shannon Graves, Louisville

Experience and knowledge grow over time. Therefore, to allow for adaptive management, the BMP should be flexible enough to be updated and revised based upon the availability of new information.

In addition to the tips provided in this document, it is worthwhile highlighting some additional existing and ongoing work by the WBCSD that could help any company integrate the concepts of ecosystem valuation and natural capital, and also to identify business risks and opportunities:

- The *Corporate Ecosystem Services Review – ESR* (WRI, WBCSD, Meridian Institute, 2008, updated in 2012) is a generic five-step methodology that helps managers develop strategies related to the risks and opportunities arising from their company's dependence and impacts on ecosystems.
- The *Guide to Corporate Ecosystem Valuation – CEV* (WBCSD, ERM, IUCN and PwC, 2011) provides a framework to allow both ecosystem degradation and the benefits provided by ecosystem services to be explicitly valued and accounted for to improve business decision-making.

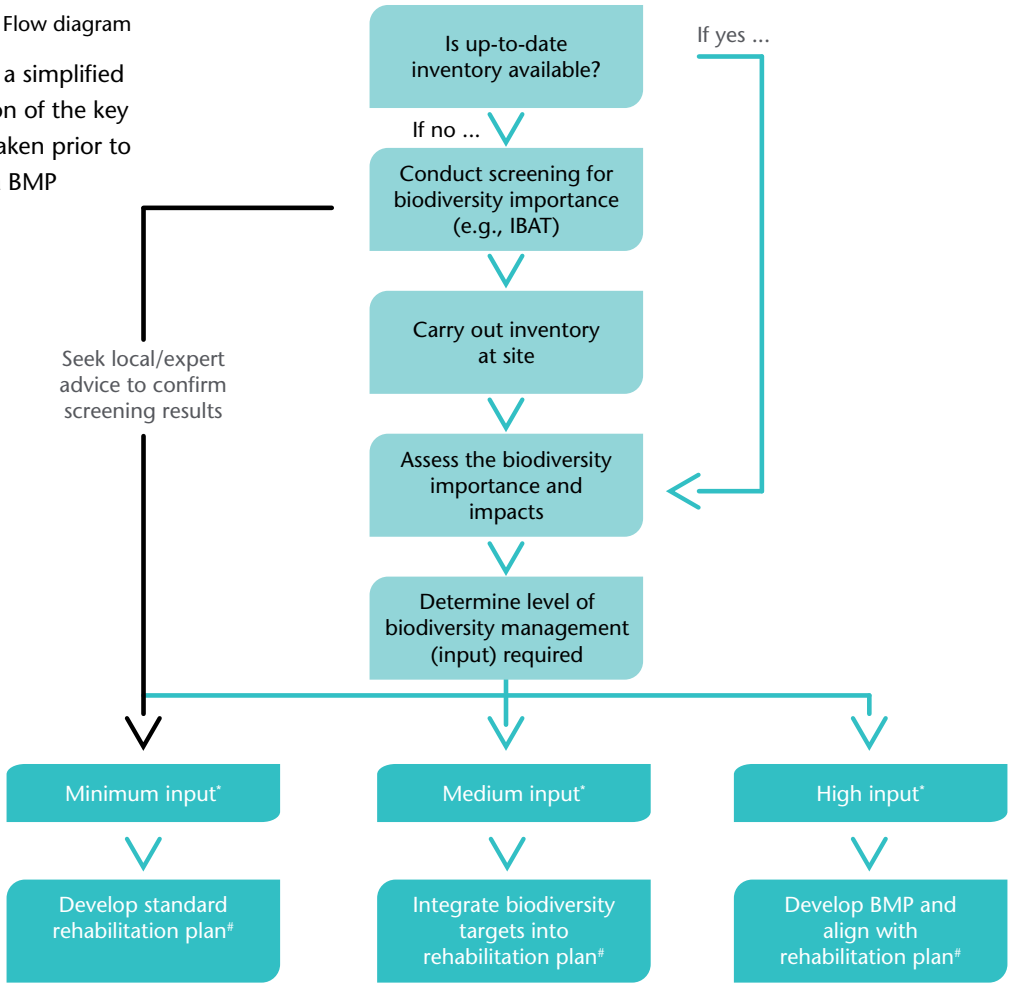
Both of these tools are included in the following:

- *Business Ecosystems Training – BET* (WBCSD, 2012) is a freely available capacity building programme on business, ecosystems and biodiversity. The curriculum includes exercises on the business case, the Corporate Ecosystem Services Review, the Guide to Corporate Ecosystem Valuation, and public policy options
- *Eco4Biz* maps out different ecosystem-related tools and approaches companies can use. It includes a decision-tree to help decide which tool might be most suitable for which needs, as well as a comprehensive glossary.

In this section you will find some of the materials that will help you with the development of your BMP. These are provided to offer some advice and some resources that may be adapted and used in a variety of biodiversity management contexts.

Figure 5 BMP Flow diagram

This figure is a simplified representation of the key steps to be taken prior to developing a BMP



*. See Figure 1 under Stage 4a (Determine priority species, habitats and ecosystems), which provides guidance on levels of biodiversity management (inputs)
#. Refer to *CSI Guidelines on Quarry Rehabilitation*

Important Note

Figure 5 is a simplified flow diagram and therefore cannot reflect all biodiversity scenarios, for example if the site in question is a karst area with very little existing knowledge of species present or ecosystem function. Given that a full biodiversity inventory is not possible at all sites owing to cost, skills requirements or other practical reasons, a fundamental assessment check should be performed. This involves answering the key questions identified under site significance in Stage 2, and using the variety of tools provided to identify key biodiversity values in the region (links also provided in Stage 2). In this way, if a site is identified as having high levels of biodiversity, the company response can be escalated as required.

Figure 6 Overall check-matrix for biodiversity goals and steps*

Biodiversity goals can be addressed by a variety of steps. This check-matrix provides a useful cross-reference tool to record which steps are being taken at a site to address which goals, and to highlight where further work could be done.

Steps taken to achieve each biodiversity goal	Biodiversity goals: Avoid damage to important habitats	Avoid species mortality and stress	Remove/control invasive exotics	Reverse/reduce habitat fragmentation	Rehabilitate any damaged habitats	Plant only appropriate local species	Make industrial areas more natural
Train and organise lead local employees							
Consult and involve local biodiversity experts							
Involve local stakeholders in plans and actions							
Consult local/national plans and regulations							
Partner with other local sites and/or operators							
Establish baselines and monitoring regimes							
Consider biodiversity in decisions about sites							
Integrate biodiversity into management processes							
Plan actions to conserve/enhance biodiversity							
Implement, sustain and modify planned actions							
Educate visitors, staff, residents and others							
Report results of monitoring/actions/education							

Taken from *Lafarge Biodiversity Guidance, Working with Nature*

*Note: This is just a tool for cross-checking some potential biodiversity goals with actions or steps that may connect to these goals. It is not intended to represent or explain direct correlation between actions and goals.

In addition to a BMP, every site will need a more detailed work schedule to implement the actions identified. The templates provided below, based on examples used by Lafarge, are intended to help with that process. Template 1 may be used to capture all legal requirements, actions that have been planned and any ideas that come about but may not yet be implementable. Template 2 is a sample of an actual action plan. This includes different short- and medium-term actions, priorities, periodicity (which season), frequency, etc. It gives the specific, on the ground instructions required to actually implement the BMP.

Template 1 can be adapted according to the local context and the requirements of any national environmental manager. It can be split into six parts: the long-term objectives, the medium-term objectives (operational objectives), the actions, the priority levels, the origin of the proposal (proposed by) and the date of the proposal (date). The intention is to capture all actions/ideas which will also include the long-term requirements so these can be scheduled for action plans in the future. Ideally these actions/ideas should be SMARTER (specific, measurable, attainable, relevant, timely, evaluate, re-evaluate), though the key purpose here is just to capture the actions which can be refined using the SMARTER criteria in the next sheet, the action plan. Be exhaustive: there is no need to prioritise the actions at this stage because this will be done on the next sheet (action plan) by choosing the ones which can feasibly be implemented within the action plan (which typically covers a five-year period).

Explanation of column headings in template 1

Long-term objectives

Long-term objectives represent the strategic vision according to three categories:

1. Development and maintenance of site biodiversity
2. Knowledge-base of site biodiversity
3. Education, awareness and involvement

These three categories should be sufficient to classify the medium-term objectives.

Medium-term objectives

Keep in mind that all objectives should be SMARTER: specific, measurable, attainable, relevant, timely, evaluate, re-evaluate

Priority level

Level 1: Legal obligation
Level 2: The topic is very important and it should be one of the main targets of the BMP
Level 3: Other topics

Proposed by

This item will help you to know who you should contact to better understand the targets and objectives of the action

Date

The date of the proposal will help you to know if you have to update these actions; for example, a legal obligation which is 10 years old should be checked.

Notes

Indicate all things you have to keep in mind:

- If you will really be able to do the action,
- When you plan to do it (is it after mining period?)

Template 2: The Action Plan. This is for use after the selection of the actions defined in Template 1, the sheet with objectives and actionable steps. The action plan is typically developed by the quarry and environment managers and includes consultation with relevant stakeholders. A plan is typically for five years (but this can depend on the company) and is intended to be a living document and therefore should be reviewed annually and revised where needed. It is important to keep copies of past plans as a record to show the work accomplished. The table below is an example of how the action plan may be presented. This can be adapted according to the local context and the requirement of the national environmental manager.

Explanation of column headings in template 2

Targets

The first two columns are based of the summary table: medium-term objectives and their priority level

Years

A 5-year planning cycle could be used, for example

Period

When will you do it ? It can be a month, a season, a period. The period can be approximate; it depends on each target.

Frequency

Do you have to repeat this action regularly ?
At what frequency?

Financial need

Human needs and financial needs can be based on estimations

Annual result (year N+1)

To complete at the end of each year. You can copy the whole table into another sheet if necessary, in order to add comments for each action each year

Comment

Indicate if you have been able to meet the deadline. If not, give an explanation.

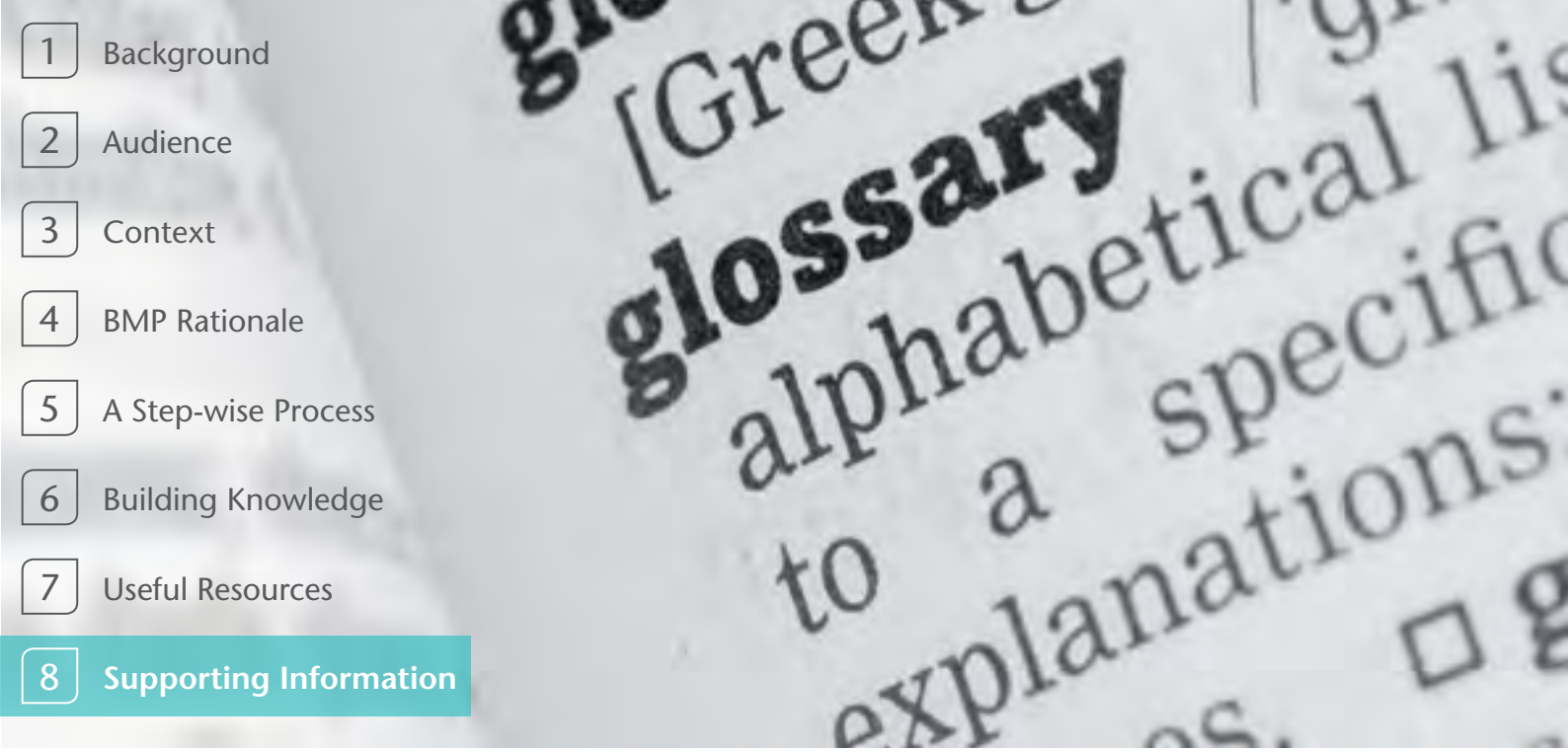
Result

J = Happy face (good result)
K = Neutral face (correct result)
L = Sad face (failure: adapt so as to improve the result if possible)

Template 1 Biodiversity objectives and respective actions arising from the BMP

Long-term objectives	Medium-term objectives	Actions	Priority level	Proposed by	Date	Notes
Preservation and enhancement of biodiversity	1. Control exotic and invasive species	Uprooting Prunus laurocerasus Caucasica in the centre of the woodland	3	The legal authority	2011	
		Monitoring of Prunus laurocerasus Caucasica	3	Internal	2012	
	2. Conserve and promote hedgerow network	Preservation of the existing hedge	1	The legal authority	2009	
		Maintain the hedges with an ecological method	3	Internal	2012	Check methods with the NGO
		Plant hedge on the north boundary of the quarry	1	The legal authority	2009	To be done in 6 years: not to include in the 201X-201X BMP
	3. Promote wetland areas	Create new wetland areas	3	Partner (NGO)	2011	After mining period
		Limit material stocking on wet areas	2	Internal	2012	
		Preserve existing water bodies	3	Partner (NGO)	2011	
		Favour temporary ponds for species at stake	2	Internal	2012	
	4. Medium-term objective n°4	Action 1				
		Action 2				
		Action 3				
	5. Medium-term objective n°5	Action 1				
		Action 2				
		Action 3				
		Action 4				
Knowledge-base of site biodiversity	6. Monitor biodiversity	Plan fauna and flora monitoring schedule	1	The legal authority	2009	
		Calculate the long-term biodiversity index	3	Internal	2012	To be done in 2017 and 2021 (not to include in the 20XX-20YY BMP)
	7. Medium-term objective n°7	Action 1				
		Action 2				
	8. Medium-term objective n°8	Action 3				
Education, awareness and involvement of stakeholders in the protection of biodiversity	9. Increase team and local population awareness about biodiversity and its significance	Sensitise employees: provide introduction to biodiversity in a meeting format (by the NGO partner) followed by a visit of the site to observe species	3	Internal	2012	

Targets / Actions	Priority	Completed/ in progress (add text)	Years 2014	2015	2016	2017	2018	Period	Frequency	Stakeholders involved	Financial need	Person responsible	Annual evaluation (year N+1) Result	Comment
Uprooting Prunus laurocerasus Caucasica in the centre of the woodland	3		X					end of winter	one time					
Monitoring of the Prunus laurocerasus Caucasica	3		X	X	X	X		spring to autumn	every month					
Maintain the hedges with an ecological methodology	1		X	X	X	X	X	April-May or Sept-October	once a year					
Plant hedges on the north boundary of the site	3								once		± 4000 €			
Limit material stocking on wet areas	2		X	X	X	X	X	permanent	perma-nent		0 €			
Preserve existing water bodies	3													
Favour temporary ponds for species at stake	2			X	X									
Action 1														
Action 2														
Action 3														
Action 1														
Action 2 etc.														
Plan fauna and flora monitoring			X			X		Feb to Sept	1 study / year		5,000 €			



Glosssary

biodiversity: The variability among living organisms within species, between species, and between ecosystems

biodiversity action plan: An internationally acknowledged instrument for the protection, promotion and development of species and habitats. (Source: *Heidelberg*)

biodiversity offsets: "Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken." (Source: *Business and Biodiversity Offsets Programme*, BBOP)

cumulative impacts: Impacts on natural and social systems that accumulate over time and space.

diversity: Variety of biotic systems; diversity in species, structure and function may be distinguished in spatial and temporal coordinates

ecosystem: A dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit.

ecosystem services: Sometimes called "environmental services" or "ecological services" – these are the benefits that people obtain from ecosystems. Examples include freshwater, timber, climate regulation, protection from natural hazards, erosion control and recreation. (Source: *Millennium Ecosystem Assessment, 2005*)

endemic species: A species that is only found in a particular region or country

fauna: The entirety of all animal species of an area

flora: The entirety of all plant species of an area

geographic information system (GIS): A computer system that facilitates the visualization, questioning, analysis, interpretation, and understanding of data, to reveal relationships, patterns, and trends

habitat: Place where an individual or a population lives

habitat fragmentation: When habitat is broken up into smaller isolated parts by human activity

Integrated Biodiversity Assessment Tool (IBAT): IBAT for business is an innovative tool designed to facilitate access to accurate and up-to-date biodiversity information to support critical business decisions. (Source: *IBAT*)

indicator: Shows the change or the achievement of a state, for instance, indicators for measuring biodiversity

invasive exotic species: A non-native species that can spread uncontrollably in a certain area

IUCN Red List Species: A species recognized by the International Union for Conservation of Nature (IUCN) as being threatened with global extinction

mitigation: Companies do their best to reduce, neutralize, and repair the impacts of their activities on people and the natural environment.

mitigation hierarchy: A set of steps taken to reduce and alleviate residual environmental harm as much as possible, through mitigation, reduction, restoration, and avoidance. Offsetting and compensation are the last two

steps of the hierarchy when all other steps have been taken. (Ref. *Business and Biodiversity Offsets Programme*, BBOP)

native species: A term used in biogeography to describe a species whose presence in a particular country, region or ecosystem is the result of only natural processes, with no human intervention, i.e. indigenous (opposite: exotic)

natural capital: The value of nature to people, society, businesses and the economy; the stocks of physical and biological resources and the capacity of ecosystems to provide a flow of services that contribute to human well-being and sustainable development

natural capital: The value of nature to people, society, businesses and the economy; the stocks of physical and biological resources and the capacity of ecosystems to provide a flow of services that contribute to human well-being and sustainable development

no net loss (NNL) & net positive impact (NPI): A target for a development project in which the impacts on biodiversity caused by the project are balanced or outweighed by measures taken to avoid and minimise the project's impacts, to undertake on-site restoration and finally to offset the residual impacts, so that no loss remains (BBOP). Where the gain exceeds the loss, the term net positive impact (or net gain) may be used instead of no net loss.

offsets Biodiversity: offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken (BBOP, 2014)

planetary boundaries: In 2009, a group of 28 internationally renowned scientists identified and quantified a set of *nine planetary boundaries* within which humanity can continue to develop and thrive for generations to come: stratospheric ozone layer; biodiversity; chemicals dispersion; climate change; ocean acidification; freshwater consumption and the global hydrological cycle; land system change; nitrogen and phosphorus inputs to the biosphere and oceans, and atmospheric aerosol loading. (Source: *Stockholm Resilience Centre*)

population: Entirety of all individuals of one species within a certain habitat

rehabilitation: Establish and provide stewardship for stable, safe state land area, and a self-sustaining ecosystem that must be compatible with its natural environment and suitable for the proposed future use of land

rehabilitation plan/project: Encompasses the planning, implementation and monitoring of rehabilitation of a quarry. Planning is implied as the formal and public outcome of the process for organizing rehabilitation works

restoration: Re-establishing the original ecosystem, the habitat or their functions in the undisturbed way in which they originally existed, including biological, chemical and physical elements

stakeholders: People or institutions that feel they may be affected by, or may affect, an organization's activity

Acronyms

BAP	Biodiversity action plan; this term is often used interchangeably with BMP, or biodiversity management plan
BBOP	Business and Biodiversity Offsets Programme
BMP	Biodiversity management plan
CBD	Convention on Biological Diversity
CSI	Cement Sustainability Initiative of the WBCSD
EBRD	European Bank for Reconstruction and Development
EMS	Environmental management system
ESIA	Environmental and social impact assessment
GIS	Geographic information system
GRI	Global Reporting Initiative
IBA	Important Bird and Biodiversity Area (IBA), a designation employed by BirdLife International
IBAT	Integrated Biodiversity Assessment Tool
ICMM	International Council on Mining and Metals
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
NBSAPs	National Biodiversity Strategies and Action Plans
NGO	Non-governmental organization
SIC	Site of community interest (Sito di Interesse Comunitario) in Italy
UEPG	European Aggregates Association (Union Européenne des Producteurs de Granulats)
UNEP	United Nations Environment Programme
WCMC	World Conservation Monitoring Centre
WRI	World Resources Institute
WWF	World Wide Fund for Nature

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About the World Business Council for Sustainable Development (WBCSD)

The World Business Council for Sustainable Development (WBCSD), a CEO-led organisation of some 200 forward-thinking global companies, is committed to galvanising the global business community to create a sustainable future for business, society and the environment. Together with its members, the council applies its respected thought leadership and effective advocacy to generate constructive solutions and take shared action. Leveraging its strong relationships with stakeholders as the leading advocate for business, the council helps drive debate and policy change in favour of sustainable development solutions.

The WBCSD provides a forum for its member companies – who represent all business sectors, all continents and a combined revenue of more than $7 trillion – to share best practices on sustainable development issues and to develop innovative tools that change the status quo. The council also benefits from a network of 65+ national and regional business councils and partner organisations, a majority of which are based in developing countries.

www.wbcsd.org

About the Cement Sustainability Initiative (CSI)

The CSI is a global effort by 24 leading cement producers, with operations in more than 100 countries. Collectively, these companies account for around 30% of the world's cement production and range in size from very large multinationals to smaller local producers. All CSI members have integrated sustainable development into their business strategies and operations, as they seek strong financial performance with an equally strong commitment to social and environmental responsibility. The CSI is an initiative of the World Business Council for Sustainable Development (WBCSD).

www.wbcsdcement.org
www.wbcsdcement.org/biodiversity

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