QUARRY LIFE AWARD

International Winners

EDITION 2016

HEIDELBERGCEMENT

THE QUARRY LIFE AWARD

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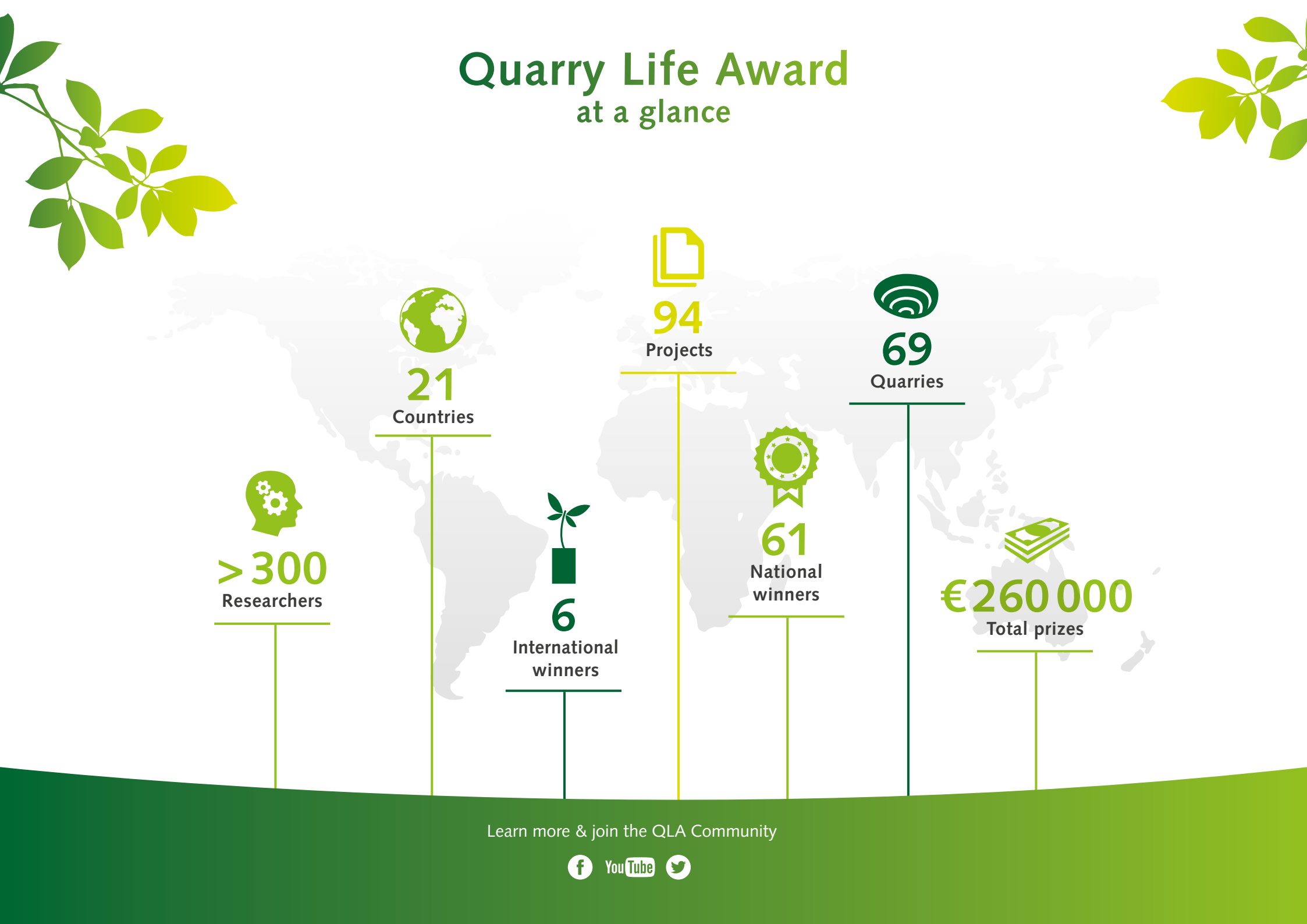
Quarry Life Award
at a glance



Learn more & join the QLA Community

Quarries: a great chance for biodiversity promotion

Dear nature fans,

For HeidelbergCement protecting nature and managing biodiversity in our quarries play an important role. Quarries and gravel pits transform the existing landscape into a completely new landscape. That's why it is our duty to minimize our impact on nature, and implement environmentally sound quarrying practices.

Biodiversity management is not new to HeidelbergCement: We have recognized that quarries are particularly suited for promoting biodiversity during and after operations. For many decades now we have been implementing projects in our quarries and pits worldwide. The fact that we work together with local partners makes these projects even more valuable:

we do not only gain external expertise, but also open the door for local perspectives and needs. I am sure that this approach has helped us to build our leadership position in biodiversity management.

To build on our cooperation with nature conservation organizations, scientific experts and local communities, we initiated the Quarry Life Award in 2011. Thanks to this bi-annual international competition and the work of hundreds of researchers worldwide, we have been able to further demonstrate the positive contribution that quarries can make to biodiversity. The participating projects have significantly increased scientific knowledge and have helped raise the awareness of biodiversity issues among the public and our own employees.

Following an impressive trend from the first two editions in 2012 and 2014, this latest edition has continued to exceed expectations with a record submission of 454 project proposals from 22 countries. During the 2016 edition, hundreds of young researchers, associations, schools and universities were involved in the selected projects. Through the national juries, Ministers of Environment, Education or Industry, as well as scientific experts and prominent NGOs offered their support to review and promote the projects. Over the third Edition the website attracted more than 75 000 visitors, while the public vote winner alone attracted more than 20 000 votes!

We hope the 2018 edition will continue to break records and we will see again many high level projects helping to continue research or evolve towards partnerships with the mining sector, NGOs or governmental institutions. With the new Quarry Life Award concept incorporating now a Research stream and a Community stream - we hope to welcome new ideas and reach a greater audience.

We would like to thank all past participants for the exceptional scientific results of their projects as well as the educational concepts and sustainable business ideas they developed. Despite their diversity, they all had something in common: the curiosity to learn about the specifics of the species in mining sites and to share their knowledge with the public.

Now, we are happy and proud to present to you the winning projects of the Edition 2016 through this brochure. All of these projects are fascinating – their initiators even more so. Take a look at them, and you will see the huge value of getting involved and making nature the biggest winner.

I wish you enjoyable reading.

Bernd Scheifele

Dr. Bernd Scheifele
Chairman of the Managing Board
HeidelbergCement

INTERNATIONAL AWARD CEREMONY 2016

Quarry Life Award – the International Ceremony

On 8 December 2016, the winners of the International Quarry Life Award were presented in the BEL Conference Centre in Brussels, one of the largest passive buildings in Europe today. Launched in 2011 by HeidelbergCement, the Quarry Life Award is a bi-annual competition that aims to explore innovative ideas to promote biodiversity at quarry sites and calls on students, graduate students or researchers (individually or in groups) to boost biodiversity in quarries and pits.

Dr Bernd Scheifele, Chairman of the Managing Board of HeidelbergCement, emphasized the importance of the competition to the company:

"The protection of species diversity and the sustainable extraction of raw materials are fundamental pillars of our sustainability strategy. Through the Quarry Life Award, we promote new knowledge about biodiversity in our quarries as well as innovative, practical conservation concepts. The projects and research results do not only serve ourselves alone. We seek to cooperate with various stakeholders from the spheres of education, science and conservation to increase awareness of the biological value of quarrying sites."

Patricia Zurita, CEO of BirdLife International, emphasized the importance of partnerships for nature & biodiversity:

"The Quarry Life Awards are truly remarkable, unique examples in the cement and mining sector, where the company opens wide its doors to scientists and nature lovers to explore the amazing power of nature to flourish, and not just survive, in the extreme environmental conditions of mining sites. We at BirdLife International will continue to do our best to work with HeidelbergCement to support environmental sustainability by offering our core strengths: scientific credibility, a link to the grassroots and the ability to link local action to global vision.»

Daniel Calleja Crespo, Director-General for Environment at the European Commission, also underlined the importance of cooperation between industry, conservation organizations and civil society:

"[These partnerships] have provided the Commission with substantial 'food for thought' about how to improve the implementation of the EU's nature legislation. The European Commission welcomes [Heidelberg Cement's] efforts to recognise the value of nature and integrating natural capital and biodiversity into economic decision making. We welcome the openness to share these findings and best practices. This will encourage more companies and the industries to move in this direction."

In a year of 94 incredible projects, the international jury had a very hard time selecting just six. The international jury was composed of **Dr Carolyn Jewell** (HeidelbergCement), **Dr Erasmus Owusu** (University of Ghana), **Dr Ani Mardiastuti** (Bogor Agricultural University, Indonesia), **Dr Michael Rademacher** (University of Applied Sciences Bingen, Germany), **Richard Grimmett** (BirdLife International), **Dr Ulrich Tränkle** (AGLN, Landscape Planning & Nature Conservation Management) and **Daniel Gauthier** (former member of the HeidelbergCement Managing Board).

We have the pleasure to reveal the winners of the 2016 edition and their incredible projects!

Congratulations to all who participated in this year's Quarry Life Award!


ENVIRONMENT
COMMISSION


€ 10,000
€ 30,000


THE QUARRY LIFE AWARD


€ 30,000


THE QUARRY LIFE AWARD


Wahyudi Nelvianto
€ 10,000


€ 10,000
€ 10,000
€ 10,000
€ 10,000
€ 10,000
€ 30,000

TIP ! CLICK ON THE TITLE TO ACCES THE PAGE !

Quarry Life Award presents
the International Winners 2016

GRAND PRIZE WINNER

Rocío de Torre Ceijas, Daniel Martín Collado, Maria Dolores Jiménez, Lucas de Torre Ceijas

Spain

HABITAT & SPECIES RESEARCH AWARD

Wahyudi Nelvianto, Tubagus Samudra Cahaya, Hafsah Ainu Zakhrof, Zulfikar Ali Akbar

Indonesia

BIODIVERSITY MANAGEMENT AWARD

Emma Svahn, Sandra Nilsson, Markus Hall

Sweden

EDUCATION & RAISING AWARENESS AWARD

Yanina Dmitrakova, Alina Tarasova, Ivan Alekseev

Russia

BEYOND QUARRY BORDERS AWARD

Daniel Gómez de Zamora Martínez, Verónica Cruz, César García, Fernando Viñegla

Spain

STUDENT PROJECT AWARD

Evangelische Grundschule Holzdorf

Germany

Learn more & join the QLA Community

Spain

GRAND PRIZE WINNER

Rocio De Torre Ceijas, Daniel Martin Collado,
Maria Dolores Jimenez Escobar, Lucas De Torre Ceijas

2016
INTERNATIONAL WINNERS

BACK TO LIST

LINKING QUARRIES AND SURROUNDINGS BY RESTORATION ECOLOGY FOR SEMI-AQUATIC MAMMALS

BACKGROUND

The extraction of materials in gravel quarries produces artificial water bodies which, when well-managed, can be colonised by several species, including those under threat. Such aquatic-terrestrial habitats are scarce in Mediterranean ecosystems and so present opportunities for biodiversity enhancement. The connectivity of these habitats with the surroundings is key to ecological stability and sustainability.

OBJECTIVE

To enhance the connectivity and biodiversity of gravel quarry lagoon systems and their surroundings.

METHOD & STUDIES

The team used the Eurasian otter (*Lutra lutra*) as the indicator species to analyse the state and connectivity of the quarry lagoon system. They complimented this study with habitat suitability and ecological connectivity analyses.

> **We were very impressed by the multifaceted approach and clear technical output that can be used across our quarries.**
>
> Dr Carolyn Jewell
> Head of International Jury

Click here to watch otters at play.

OTTER POPULATION STUDY

Three complementary analyses were performed using 19 sampling transects of 600m in length covering water body types both on and off site (artificial lagoons, ditches, the Duero river and irrigation channels).

1. **Camera-trap photo analysis**
2. **Spraint marking intensity analysis**
3. **Genetic analysis of spraints**

The establishment of an otter population in the lagoons and their movements in the wider area confirm that extraction is compatible with high local biodiversity. Otters use the lagoons for breeding. This and their subsequent dispersion into the surroundings reinforces the source-sink dynamic of the area, demonstrating that the gravel pit creates essential habitats for this species.

Click here to watch the winner's interview

ECOLOGICAL CONNECTIVITY ANALYSIS

The team used Geographical Information Systems (GIS) to identify:

- **Functional connectivity**

  The degree to which the landscape facilitates or impedes movement of species between aquatic habitats.

- **Matrix permeability of otters**

  how easy it is for otters to move through the territory between water bodies.

The creation of the gravel quarry lagoon system increased the territory connectivity remarkably. The matrix permeability model resulted in a map which enabled evaluation of permeability and identification of the best habitats. This provides a tool for action planning to enhance connectivity between optimum areas, both at Aridos Sanz and other sites.

Click here to visit the project blog

4
Team members

12
Otters

3199
Photos

BACK TO LIST

HABITAT SUITABILITY ANALYSIS

This assessed habitat suitability for otters using multivariate statistical methods which integrate the environmental features of the sampled areas with the results of the otter population study.

Forested buffer areas and vegetation cover around the edges of water bodies are key to reduce the negative impact of nearby human activity on the otter population.

Indonesia

HABITAT & SPECIES RESEARCH AWARD

Wahyudi Nelvianto, Tubagus Samudra Cahaya,
Hafsah Ainu Zakhrof, Zulfikar Ali Akbar

2016
INTERNATIONAL WINNERS

BACK TO LIST

STUDY OF SOIL ARTHROPODS AND EARTHWORM DIVERSITY AS A BIOINDICATOR FOR RECLAMATION SUCCESS

BACKGROUND

Mining is responsible for drastic changes to the landscape during the exploitation process. The success of reclamation activities in restoring ecosystems is often solely measured on the growth of planted vegetation. This, however, does not give an accurate depiction of an ecosystem's progress. Because they occupy the widest range of microhabitats and niches, arthropod and earthworm populations (growth rate and variety) can act as bioindicators, giving an idea of the health of an ecosystem, and thereby the success of reclamation activities.

OBJECTIVE

To identify the correlation between soil arthropod and earthworm diversity with habitat complexity as a bioindicator for reclamation success in the Hambalang quarry.

> **"The results demonstrated the importance of habitat complexity in reclamation designs, which really sparked our interest.**
>
> Dr Carolyn Jewell
> Head of International Jury

STUDY SITES

19 plots in 5 reclaimed areas, plus 2 reference sites

- Sites 175-630m above sea level
- Rainfall 290mm/year
- Temperature range 21 - 31°C
- 4 land uses: cassava fields, mixed forest, mahogany stands, rice paddies

METHOD

Soil arthropods were sampled using pitfall traps placed proportionally in the 19 plots.

Earthworms sampled three times in each of the sites by digging 30x30x20m³.

Habitat complexity was assessed in circular plots of 0.1ha to measure different habitat features e.g. logs, rocks, vegetation canopy.

Diversity was analysed using species richness and abundance, and Shannon-Wiener's index of diversity.

FINDINGS

Earthworms were found in all land uses of the reclamation sites. This indicates that the reclamation increased the suitability of the substrate as a habitat for earthworms.

The highest species diversity (Shannon-Wiener index) of athropods was found within the cassava fields and mixed forests; bare ground had the lowest.

The highest species richness of arthropods was found in the mahogany stands; bare ground had the lowest species richness of arthropods and earthworms.

Habitat complexity in the measured reclamation sites had high positive correlation with individual abundance and species richness.

CONCLUSION

The positive correlation between habitat complexity and arthropod and earthworm species richness and abundance make such species useful bioindicators through which to measure reclamation success. As monitoring biodiversity is complex and time consuming, using a bioindicator which is sensitive to environmental changes is a practical way of assessing the quality of an ecosystem. During the process of reclamation, parameters influencing habitat complexity should be strongly considered because of the effect on soil arthropod and earthworm presence.

5
Team members

5
Reclamation sites

158
Species identified

BACK TO LIST

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Sweden

BIODIVERSITY MANAGEMENT AWARD

Emma Svahn, Sandra Nilsson, Marcus Hall

2016
INTERNATIONAL WINNERS

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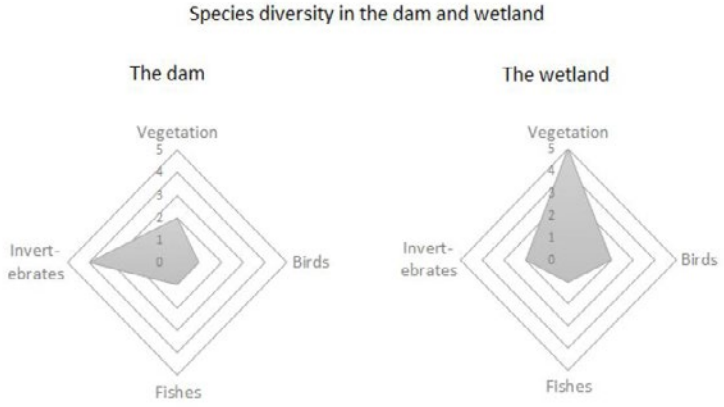
OPTIMISING WETLAND FUNCTIONS TO LOCAL CONDITIONS IN CONNECTION TO QUARRIES

BACKGROUND

As areas of natural habitats decline, rehabilitation of ecosystem functions in landscapes affected by human activities will play an increasingly important role in maintaining global biodiversity. Many species rely on wetland habitats which have, unfortunately, been exploited in the past. At the limestone quarry of Cementa Degerhamn, an artificial pond and adjacent wetland act together as a water retainer for quarry drainage water. Through weekly sampling from April to July, the project analysed the effectiveness of this complex at retaining water and nutrients in order to make recommendations for improvement of both the artificial pond and the wetland.

EVALUATION CRITERA

- Morphology/structure
- Water flow
- Volumes
- Nutrient concentrations
- Nutrient transport
- Nutrient retention
- Wetland productivity
- Wetland biodiversity



RECOMMENDATION

Following the analysis of the artificial pond and wetland, the team suggested reshaping the pond in order to create a multi-functional wetland. They proposed a design for this, optimised to local conditions. The proposed alvar wetland will increase local biodiversity and the quality of the drainage water.

> "The detail of the study was very impressive, with clear practical guidance for us to integrate into our operations."
>
> Dr Carolyn Jewell
> Head of International Jury

WETLAND DESIGN

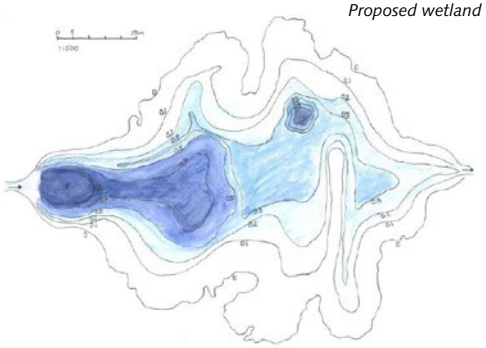
- Increase surface area and volume of the wetland to prolong water retention time, resulting in improved nutrient retention and greater space for varied habitats.
- The wetland's shoreline should slope gently and its perimeter be irregular. Both features benefit biodiversity.
- A deeper pool near the water inlet will slow water flow and increase water retention time, thus decreasing particle transport out of the wetland.
- The deep pool should be followed by a series of shallow areas with a variety of depth profiles and a complex bottom structure. This will create a mosaic of habitats for a wide array of aquatic plants and invertebrates.
- Vegetation coverage should be encouraged over a large area to increase nutrient retention (e.g. nitrogen), reduce resuspension of sediment and increase biodiversity of aquatic fauna.

CONCLUSION

Creating and enhancing wetlands is a way for quarries to reduce environmental impact and contribute to the preservation or restoration of this dwindling habitat.

Whilst this design is tailored to the local environmental conditions, the principles and general concepts can be applied to other limestone quarries.

Proposed wetland design



3
Team members

13
Parameters measured

1
wetland design

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Russia

EDUCATION & RAISING AWARENESS AWARD

Yanina Dmitrakova, Alina Tarasova, Ivan Alekseev

2016
INTERNATIONAL WINNERS

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BIODIVERSITY IN SPACE & TIME

During the survey, **dune chafer beetles** (*Anomala dubia*) were found for the first time in the region. This caused great interest to study the quarry among entomologists.

SCIENTIFIC STUDY

The team carried out research to assess the relationship between the geography of Pechurki quarry and biodiversity by doing comparitive analyses of different ecotypes. They inventoried the soil, and flora and fauna (including 14 protected plant species) before mapping and comparing the plant communities in different parts of the quarry. Following the vegetation survey, the team suggested cost-effective measures to improve the process of rehabilitating the quarry to nature.

During the project the team did extensive community outreach, for which they have won this prize.

EDUCATION & OUTREACH

The second part of the project was to introduce the local community to the opportunities provided by Pechurki for local biodiversity, and to encourage them to take responsibility for biodiversity and the environment. This included encouraging children to be proactive in environmental protection and promotion.

As evident in the project's name, the aim was to connect with people of all ages from as wide a network as possible. To succeed in this, the team organised and participated in a multitude of awareness-raising activities...

Click here to watch the video

> **The variety and scope of outreach activities was incredible, with tailored communication to engage all demographics.**
>
> Dr Carolyn Jewell
> Head of International Jury

TEACHING MATERIALS

The team prepared two lessons on quarry biodiversity and water resources. The materials for these were sent to the St Petersburg Natural Protection Community and middle schools.

The project team themselves gave 32 lessons, and at least 40 additional lessons have been given by teachers and volunteers using the team's teaching resources.

A quarry excursion was also organised for children.

SPEECHES

During the six month research period, the team gave 11 scientific presentations on biodiversity in the Pechurki quarry and the effect of quarries on the natural environment at both Russian and international scientific conferences.

As a part of this, the team published abstracts and now have a scientific paper in print.

COMPETITIONS

An essay contest **"If the quarry inhabitants could speak"** was conducted for pupils in St Petersburg schools. There was also an illustration competition run at a school for children with Down's syndrome.

12
Team members

70+
Eco-lessons

2500+
People reached

BACK TO LIST

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Click here to visit the project blog

MULTIMEDIA

The team made the use of multiple forms of communication in order to reach as wide an audience possible. They produced an original animated video about biodiversity in quarries, organised several photo exhibitions and also presented at a press-conference attended by local radio, television and newspapers.

Spain

BEYOND QUARRY BORDERS AWARD

Daniel Gómez de Zamora Martínez, Verónica Cruz,
César García, Fernando Viñegla

2016
INTERNATIONAL WINNERS

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STEPPING PONDS: ENHANCEMENT OF CONNECTIVITY FOR AMPHIBIANS IN RIVERSIDE GRAVEL PITS

BACKGROUND

Amphibians are one of the most globally threatened group. In Europe, the decline is affected by habitat reduction and fragmentation. The process of mineral extraction can often result in floodable hollows. These newly created holes in the ground can be designed in such a way as to become amphibian-friendly habitats and thus assist in reducing their decline.

OBJECTIVE & METHOD

Over the six month research period, the project team evaluated the potential of the Aridos Sanz gravel pit to increase landscape connectivity for amphibians. To do this, 75 water bodies were assessed according to 27 attributes related to physical and hydrological conditions, water quality, vegetation, fauna and terrestrial uses and cover and hibernation sites. The team defined a habitat suitability for each of the five species found in the gravel pit and surroundings.

FINDINGS

From the species research and habitat indexing, the team was able to define habitat suitability and landscape connectivity for each species. Based on these, they made practical recommendations to improve habitat management for amphibians and evaluated these recommendations for efficacy.

> **This project captured the essence of 'beyond quarry borders', highlighting the importance of our sites as stepping stones through the landscape.**
>
> Dr Carolyn Jewell
> Head of International Jury

RECOMMENDATIONS

CONNECTING CORRIDORS

To connect isolated water bodies around the pit, corridors can be formed using a series of ponds, pond systems, water troughs, shallow areas and by reducing shore slopes. Using such a corridor to connect water bodies to the existing fluvial network would greatly increase habitat connectivity.

The team has designed two corridors which could be implemented at Aridos Sanz, one using an abandoned railway on the site.

NATTERJACK TOAD

The natterjack toad (Epidalea calamita) colonises shallow water bodies with no vegetation - such habitats were not used by the other species recorded.

Specific recommendations:

- Shallow holes to enable water accumulation for temporary habitat creation
- Minimise machinery transit around waterbodies with tadpoles
- Remove pioneer vegetation to prevent colonisation by other amphibians as the waterbody matures

INVASIVE ALIEN SPECIES

The presence of the invasive exotic red crayfish (Procambarus clarkii) in nearly all water bodies in the Aridos Sanz gravel pit is very important for the amphibian population. It is an aggressive predator and its prevelance therefore hampers amphibian development. The crayfish are well adapted to the environment, burrowing deep in the soil during the summer droughts and able to travel long distances over land to new water bodies.

Habitat invasion prevention methods:

- Use a liner in ponds to prevent crayfish from burrowing
- Fencing that prevents crayfish - but not amphiban - entry to water bodies

12 Team members

75 Water bodies

2 Connecting corridors

BACK TO LIST

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CONCLUSION

For amphibians, gravel pits already provide suitable habitats which are often scarce due to other land uses. With simple modifications during operations, gravel pits could preserve and improve these pre-existing habitats and thereby play a pivotal role in the conservation of amphibians. Recommendations made for Aridos Sanz can be applied in other gravel pits to improve habitat conditions for amphibians.

Click here to watch the video on constructing pond systems

Germany

STUDENT PROJECT AWARD

Evangelische Grundschule Holzdorf

2016
INTERNATIONAL WINNERS

BACK TO LIST

NATURE ONLY WORKS TOGETHER: PUPILS "UNDERSTAND" INSECTS AND BIODIVERSITY

BACKGROUND

Evangelische Grundschule Holzdorf is a primary school in a predominantly agricultural environment. Pupils know the environment as being used intensively for human needs. For the past two years there has been a partnership between the school and Heidelberger Sand und Kies GmbH called Naturfreunde (Friends of nature).

Inspired by the 2015 herb-planting project, the school decided to enter the Quarry Life Award with an insect hotel project. Thanks to the enthusiasm of the students and parents, the project grew and resulted in a joint venture with HEPERO GmbH, a residential facility for recovering addicts.

RESEARCH PROJECT

The students began by studying and researching insects, leading to a collective interest in wild bees and their benefit to man.

The students were fascinated by the correlation between plant diversity and wild bee proliferation and eager to learn more about the wild bee population in the area. Meanwhile, the residents of HEPERO constructed frames to be used to construct a bee hotel together with the students.

> **The enthusiasm that the students showed for enhancing the prospects of bee species was excellent.**
>
> Dr Carolyn Jewell
> Head of International Jury

DID YOU KNOW...?

- One adult bee may visit up to **80 flowers** to collect enough pollen for a single egg
- Nearly **one in three species** of wild bee is **endangered**

WILD BEE HOTEL

The hotel was built by the students and HEPORO residents on 18th April 2016.

Materials:

- Hollow plant stems embedded in clay in boxes
- Bamboo canes fixed to make mats, or inserted in boxes
- Hollow blocks partially filled with clay and hollow plant stems
- Pine cones and chicken wire

WILDFLOWER MEADOW

Thanks to the absence of fertilisers and herbicides, the renaturation area of the Lindwerder gravel pit is ideal for wildflowers.

In spring, the students supplemented the wild-flower meadow planted the previous year around the gravel pit by sowing seeds of forage plants popular with wild bees.

During six visits, the students surveyed the area to assess the meadow's plant diversity. They found 27 different species of forage plants.

INFORMATION BOARD

To inform visitors about the behaviour of wild bees and thus the importance of a bee hotel, the students designed an information board.

HEPORO built the board in their woodwork shop, whilst the students drafted short explanatory texts based on their own questions during the research period.

The board was installed on 29th August 2016 and includes cross-sections showing the structures of different bee nests.

15
Team members

200+
Bee nests

27
Wildflower species

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Click here to watch the winner's interview

Click here to visit the project blog

Special Mentions

TIP! CLICK ON THE TITLE TO VISIT THE PROJECT BLOG!

MENTION FOR THE GRAND PRIZE

Ghana **OWUSU-TWENEBOAH MICHAEL** | «Determining the Best Waste Decomposition Method for Land»

Germany **ELISABETH V. CAMPENHAUSEN** | «Nature only works together - Pupils «understand» insect and bio diversity»

MENTION FOR THE HABITAT & SPECIES RESEARCH PRIZE

Russia **MALTSEV YEVGEN** | «DNA barcoding in algae is a first stage of the research of the quarry biodiversity and monitoring»

U.K. **MARK D. STEER, EMMA REYNOLDS, HANNAH ROBINSON, JACOB BALL, ANGELIKI SAVVANTOGLOU**

«Impacts of grassland restoration on availability of bat prey »

MENTION FOR THE BIODIVERSITY MANAGEMENT PRIZE

Germany **SANDRA PSCHONNY AND SABRINA BEHRENDT** | «Great impact with little effort – optimization of reptile habitats by using existing materials»

Czech Republic **MICHAL PLÁTEK** | «Return of the pond turtle to the Czech Republic: a potential of the Hulín sand pit for biodiversity»

MENTION FOR THE EDUCATION & RAISING AWARENESS PRIZE

Czech Republic **JITKA HREŽOVÁ** | «Quarry Exploration Trail»

Belgium **JOZEF WILLEMS** | «Naturaly.....Art!"; An art based nature project»

MENTION FOR THE BEYOND QUARRY BORDERS PRIZE

Czech Republic **KARLA MEIXNEROVÁ** | «Influence of Mokra quarry on the local climate and diversity of habitats»

Spain **ROCÍO DE TORRE CEIJAS** | «Linking quarries and its surrounding by restoration ecology for semi-aquatic mammals.»

MENTION FOR THE STUDENT PROJECT PRIZE

Czech Republic **JITKA HREŽOVÁ** | «Quarry Exploration Trail»

Public Vote Winners 2016

TIP ! CLICK ON THE TITLE TO ACCES THE PAGE !

1ST PLACE IN THE PUBLIC VOTE

MICHAEL OWUSU-TWENEBOAH

Ghana

2ND PLACE IN THE PUBLIC VOTE

SITI NURLEILY MARLIANA, RETNO PRAYUDYANINGSIH, JOAQUIM BAETA

Indonesia

3RD PLACE IN THE PUBLIC VOTE

BAGUS HERWIBAWA, PURBO SUSENO

Indonesia

1ST PLACE IN THE PUBLIC VOTE

MICHAEL OWUSU-TWENEBOAH

Ghana

2016
PUBLIC VOTE WINNERS

DETERMINING THE BEST SOIL ENRICHMENT METHOD FOR RECLAMATION AT YONGWA QUARRY USING ANOVA TECHNIQUE

SOIL ENRICHMENT AND BIODIVERSITY ENHANCEMENT AT QUARRY SITE THROUGH WASTE DECOMPOSITION

This research is to promote biodiversity at Yongwa Quarry by decomposing waste using the the Heap, Pit and Windrow decomposition method. The best method will be selected based on growth rate of seedlings, organism count and cost using the concept of ANOVA Technique, and Implement the concept by enriching the soil at the quarry site and training of stakeholders.

It will involve the decomposition of waste using the three known techniques, the planting of seedlings in the compost obtained, the measurement and recording of the growth rate of the seedlings, the counting of soil living organisms in the compost and the estimation of the cost involved. Measured and recorded parameters will be analysed and the best decomposition method selected. Implement the research by reclaiming a site at the Quarry; teach the concept in schools and communities.

This research is expected to determine the best and most cost effective soil enrichment method suitable for the Yongwa Quarry Site, provide the best and right source of compost nutrients for the fauna and flora, improve soil quality, enhance insects' growth and encourage growth of beneficial organisms at the Quarry Site, train the people of the society and applied the concept to enrich farmlands and improve crop growth and yields and reduce the issue of waste management.

Click here to visit the project blog

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★★★★★ Average: **4.9/5**

4062 votes

Beposo-Shama District, Western Region

Biodiversity management, Education & raising awareness, Rehabilitation, Scientific research, Soil management

2ND PLACE IN THE PUBLIC VOTE

SITI NURLEILY MARLIANA, RETNO PRAYUDYANINGSIH, JOAQUIM BAETA

Indonesia

2016
PUBLIC VOTE WINNERS

EXPLORING CALOTROPIS GIGANTEA'S POTENTIAL AS A COST-EFFECTIVE AMELIORANT IN CLAY PIT REHABILITATION

HABITAT IMPROVEMENT THROUGH MANIPULATED SPONTANEOUS SUCCESSION OF AN INDIGENOUS SPECIES WITH ECOLOGICAL AND ECONOMIC IMPORTANCE

Natural succession is known to be the most cost-effective way of habitat restoration in the tropics. However, disturbed ecosystems with adverse soil conditions, such as clay quarries, necessitate intervention in the form of soil amelioration. To overcome this problem in the reclaimed Hambalang clay quarry, we will explore the potential of the giant milkweed *Calotropis gigantea* as a soil ameliorant. This native ruderal weed, which grows ubiquitously in Hambalang quarry's barren areas, is known for its ability to tolerate a wide array of environmental conditions, its role in heavy metal phytoremediation and as a pollinator attractant, as well as its economic value as a source of biofuel, traditional medicine, and natural fiber. It also has potential in safe-site creation, enhancing germination and facilitating the reintroduction of native flora species for an accelerated natural succession.

We will investigate the characteristics of *C. gigantea*'s growing environment in post-mined plots by examining mycorrhizal association with its roots, the presence of soil mesofauna, soil physicochemical properties, and heavy metal content in its tissue. The findings will guide the implementation of a cost-effective reclamation of Hambalang clay quarry, promote Indocement as an innovative rehabilitator of biodiversity, engage the local community by showing the economic and societal benefits of biodiversity, and contribute to the scientific community.

Click here to visit the project blog

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★★★★★ Average: **4.9/5**

3200 votes

Bogor, Hambalang

Biodiversity, Management, Rehabilitation, Scientific research, Soil management

3RD PLACE IN THE PUBLIC VOTE

BAGUS HERWIBAWA, PURBO SUSENO

Indonesia

2016
PUBLIC VOTE WINNERS

I-DRIVE

A QUICK, PRACTICAL, AND INEXPENSIVE METHOD TO DESIGN RECOMMENDATION OF RECLAMATION IN HAMBALANG

Identification of Drought Resistant Vegetation (i-Drive) is a quick, practical, and inexpensive method developed to design a recommendation of reclamation strategy in Hambalang quarry, with main focus on the vegetation resistance to drought stress.

The i-Drive steps are:

1. Preliminary survey,
2. Identification of vegetation on the land surfaces of sunken, flat, and convex areas,
3. Quantification of nitrogen-fixing bacteria and phosphate-solubilizing bacteria, and soil chemical properties,
4. Determination of the vegetation resistance to drought stress,
5. Recommendation mapping of the land reclamation strategy. The recommendations on land reclamation strategy using revegetation will accelerate the soil fertility improvement, thus becoming an effective, efficient, and economical, mainly related to an increase in biodiversity.

The drought-resistant vegetations are estimated to be varies from the level of the trees, poles, saplings, seedlings, and ground cover. In addition, the development of the alley cropping model between legume trees / shrubs along local nitrogen-fixing bacteria, and phosphate solubilizing bacteria can reduce need for fertilizers to cultivate grasses for potential alternative energy crop. These potentials will certainly attract shareholders and stakeholders, particularly the farmers to raise concerns to revegetate together, thereby contribute to company cost efficiency of the land reclamation.

Click here to visit the project blog

BACK TO LIST

★★★★★ Average: **4.9/5**

2430 votes

Bogor, Hambalang

Biodiversity management, Cooperation programmes, Invasive species, Landscape management, Rehabilitation, Scientific research, Soil management

OVERVIEW OF NATIONAL WINNERS 2016

National Winners 2016

TIP ! CLICK ON THE TITLE TO VISIT THE PROJECT BLOG!

AUSTRALIA

1st Prize Enhancing biodiversity and habitat suitability at the Kables Sands Plant for native amphibians

2nd Prize Using an alternative method to assess the species diversity of rehabilitated sites

3rd Prize Predator playground; the role of quarries in the lives of wild dogs

BENELUX

1st Prize Naturally ... Art! An educational art project based on the environment at ENCI quarry Maastricht

2nd Prize Land and freshwater snails: a too poorly known fauna of the quarries

3rd Prize Nature and quarry

BOSNIA & HERZEGOVINA

1st Prize Macrozoobenthos as Biodiversity and Habitat Quality Indicator of Quarry Ribnica's Hydroecosystems

2nd Prize Mapping Types of Habitats at the Ribnica Quarry Using Contemporary Methods in Ecology

3rd Prize Caution is the mother of wisdom

CONGO

1st Prize The preservation of endangered animal species and medicinal plant reserves in the C45 Quarry

2nd Prize The ichtyological biodiversity and the condition factor of fish species of C-45 Quarry

3rd Prize Phytosociological studies of different plant communities in the C45 Quarry

CZECH REPUBLIC

1st Prize Quarry exploration trail

2nd Prize Gravel pit Hulín: towards harmony among diverse interests

3rd Prize Experiment in biodiversity management of Quarry Mokra: Innovative approaches in ecological restoration

National Winners 2016

TIP ! CLICK ON THE TITLE TO VISIT THE PROJECT BLOG!

GERMANY

1st Prize Great impact with little effort – optimization of reptile habitats by using existing materials

2nd Prize Nature only works if we do it together - Students "understand" the insect and plant diversity

3rd Prize Quarry biodiversity in focus – exploring the barcode of life

GHANA

1st Prize Determing the best soil enrichment method for reclamation using ANOVA technique

2nd Prize Impacts of quarry dust on water resources and effects on biodiversity, the Odonata assessment

3rd Prize Geospatial assessment of biodiversity transformations in and around the Yongwa quarry site

INDONESIA

1st Prize Exploring Calotropis gigantea's potential as a cost-effective ameliorant in clay pit rehabilitation

2nd Prize Determining High Adaptability Tree Species in Former Quarry Hambalang

Joint 3rd Study of Arthropod and Earthworm Diversity as a Bioindicator for Reclamation Success; i-Drive: a Quick, Simple, and Inexpensive Method to Design a Recommendation of Reclamation on Former Limestone Quarry; Rehabilitation of Ex-Mining Area with Phytoremediation Plants and Biofertilizer Application

KAZAKHSTAN

1st Prize Usage of the Complex Method of Soil Enrichment

2nd Prize Creation of enriched ecosystem and biodiversity conservation awareness

3rd Prize Studying the role of arbuscular mycorrhiza in the formation of plant communities in quarries

NORTHERN EUROPE

1st Prize Optimizing wetland functions to local conditions in connection to quarries

2nd Prize Strategic Restoration Guidelines for Sustainable Development at Quarry Sites

3rd Prize Post-industrial biotopes re-imagined, a design proposal for Löten quarry, Sweden

4th Prize Increasing biodiversity in Aru-Lõuna limestone quarry by reclamation

National Winners 2016

TIP ! CLICK ON THE TITLE TO VISIT THE PROJECT BLOG!

POLAND

1st Prize	The active protection of the bees together with 3 D - nature visualization of the "Górażdże" limestone Quarry
2nd Prize	Measures to optimize the habitat conditions within the KSM Nowogród Bobrzański
3rd Prize	Trees as a key element in the shaping of landscape and biodiversity of post-mining areas

ROMANIA

1st Prize	Biodiversity research & raising awareness – keys for landscape and biodiversity reconstruction
2nd Prize	One Landscape, Two Stories: People and Birds
3rd Prize	Diversity, distribution, ecology of the plant communities and habitats in the Bicaz Chei quarry

RUSSIA

1st Prize	Biodiversity in space and time
2nd Prize	DNA barcoding in algae is a first stage of the research of the quarry biodiversity and monitoring
3rd Prize	Vertebrates in Pechurki: the current state of the fauna and the prospects for its settling in the quarry

SPAIN

1st Prize	Stepping ponds: enhancement of connectivity for amphibians in riverside gravel pits
2nd Prize	Writing off the problem. How does extraction of aggregate finish in beautiful landscapes?
3rd Prize	Linking quarries and their surroundings by restoration ecology for aquatic mammals

TANZANIA

1st Prize	Educational, Innovative and Entertaining Biodiversity Quarry Tour
2nd Prize	Ecological Modelling of Species Richness for measuring restoration success in Wazo Hill Quarry
3rd Prize	Analyzing the role of earthworms to improve soil drainage and biodiversity at Wazo Hill Quarry

National Winners 2016

TIP ! CLICK ON THE TITLE TO VISIT THE PROJECT BLOG!

TOGO

1st Prize	Wastes-soils-plants-animals: a cooperation to boost Sika-Kondji career biodiversity
2nd Prize	Impact of sustainable land management on biodiversity through agroforestry
3rd Prize	Creation of a park and installation of an integrated verge associated with apiculture in a quarry

TURKEY

1st Prize	Naked rock field rehabilitation by using mutualistic life systems
2nd Prize	From quarry to lap of nature
3rd Prize	Phytoremediation of the Bozalan Quarry

UKRAINE

1st Prize	Increase of ornithovariety of Rybalsky Quarry
2nd Prize	Composing a jigsaw puzzle: a sustainable ecosystem in the place of a former quarry
3rd Prize	Youth Cognitive Tourism in the used quarries/Educational tourism for youth

UK

1st Prize	Impacts of grassland restoration on availability of bat prey
2nd Prize	The invertebrate biodiversity importance of bare ground habitat in Misson sand & gravel quarry
Joint 3rd	An investigation of restored soil health at Ketton to improve ecosystem services; Biodiversity restoration - can drones provide an accurate, efficient and safe survey method?

Winners of the photo competition

«Industry & nature in harmony»

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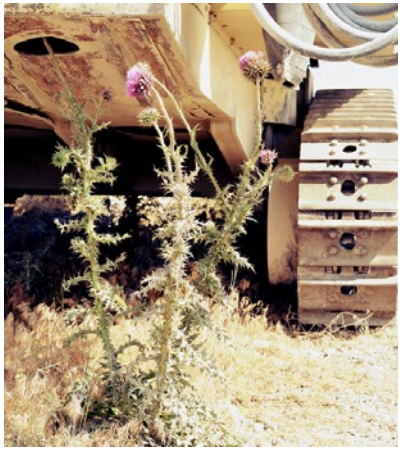

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Nature has been the biggest winner!

Join us in the **4th Edition 2018 !**

PROJECT REGISTRATION DEADLINE:
20th November 2017

RESEARCH PERIOD:
January – September 2018

THE QUARRY LIFE AWARD