# Final Project Report

## 1. Contestant profile

| | |
|---|---|
| ▪ Contestant name: | **Alexandra TELEA** |
| ▪ Contestant occupation: | Biologist |
| ▪ University / Organisation | - |
| ▪ E-mail: | |
| ▪ Phone (incl. country code): | |
| ▪ Number of people in your team: | **4** |

## 2. Project overview

| | |
|---|---|
| Title: | Biodiversity research & raising awareness – keys for landscape and biodiversity reconstruction |
| Contest: | Romania |
| Quarry name: | Iglicioara |
| Prize category:<br>(select all appropriate) | ☒ Education and Raising Awareness<br>☒ Habitat and Species Research<br>☐ Biodiversity Management<br>☐ Student Project<br>☐ Beyond Quarry Borders |

## 3. Content Table – Final Report


Abstract 01
Introduction 01
1. Project objectives 02
2. Brief Site description 02
3. Methodology 02
4. Results 04
5. Conclusions 09
Discussions & Follow-up 10

## Abstract

Nature is a living organism itself, constantly changing and adapting. Building a quarry indeed modifies the landscape, but it doesn't mean there is only scorched earth – new habitats are created, which are quickly occupied.

A quarry's landscape is very dynamic, quickly changing from month to month - thus the need to know which species reside within its perimeter. This knowledge help everyone, nature in special, when the quarry is closed and the reconstruction stage begins. Rebuilding landscapes without full knowledge of the species which are already there will certainly do more harm than good. We found interesting and rare species – they are there only due to the rocky landscapes Iglicioara Quarry has created. We found over 230 species of flora and fauna which make Iglicioara Quarry a very interesting and important anthropic area from a biodiversity point-of-view.

And then… education is the key to preserve what we have and what will be rebuilt. People have to understand the value nature brings to them and why it's important to protect wild areas. We have talked to over 200 pupils from Turcoaia village and shared the information we gathered about Iglicioara Quarry's biodiversity on social media, reaching a few thousand people.

## Introduction

Quarries are an important mineral resource for human activity, although they impact the environment one way or another. A quarry means modifications on landscape, soil and vegetation structure, changes in fauna behavior on site.

We live in a period when humanity fights for the protection and conservation of nature and when people realize the importance of reconstructing landscapes. HeidelbergCement S.A. acknowledges this and makes a top priority out of proper biodiversity management. Thus, we need to keep a close eye on what modifications arise within biodiversity structure in quarries, so that after a quarry is closed the best practices for reconstruction can be chosen.

Through our project, **"Biodiversity research and raising awareness - keys for landscape and biodiversity reconstruction"** we have been able to conduct activities for inventory and monitoring of the biodiversity from Iglicioara Quarry (Turcoaia, Tulcea, Romania) which help us understand the present day situation. The data gathered though this project can be a basis for future reconstruction and rehabilitation projects and will be disseminated to as many stakeholders as possible.

Of course, for proper biodiversity management, local denizens need to be aware of the importance of biodiversity from Iglicioara Quarry and what can be done in the future to protect this value. Raising awareness regarding biodiversity from Iglicioara Quarry wasn't restricted only to denizens from Turcoaia village, but through social media it was spread to everyone interested.

## 1. Project objectives

The goal of the project is to increase awareness regarding the importance of the Iglicioara Quarry from a biodiversity-point-of-view. To be able to accomplish this goal we had established three main objectives:
O1: Establishing the state of biodiversity in Iglicioara Quarry;
O2: Increasing awareness of the locals about the importance of the biodiversity from Iglicioara Quarry;
O3: Increasing awareness through social media about the importance of the biodiversity in Iglicioara Quarry.

## 2. Brief Site description

Iglicioara Quarry is localized in south-eastern Romania, in the northern part of the geographic region of Dobrudja, in Tulcea county. It's on the southern limit of Turcoaia village, at a distance of about 2km east of the Danube and ca. 5km west of the Măcin Mountains. With the exception of the village, the surrounding landscape Is mostly agricultural land with crops and vineyards, and pastures.

The quarry is overlaid with Natura2000 natural protected area ROSPA0073 "Măcin-Niculițel" and is in the vicinity of another 3 Natura2000 protected areas, respectively ROSPA0040 "Dunărea Veche-Brațul Măcin", ROSCI0012 "Brațul Măcin" and ROSCI0123 "Munții Măcin".

The quarry itself, although only 22.4ha of extraction site and 12.56ha of plant and utilities area, holds a diverse reunion of habitats: temporary ponds, open grasslands, loess steppe grasslands, areas colonized by ruderal vegetation, steep rock faces, screes and others. This and the fact that the quarry is situated on a main bird migration path (VIA PONTICA) makes Iglicioara Quarry a good example of the positive or negative impact a quarry can have on biodiversity.

## 3. Methodology

**3.1.** Our 4 member **team** comprised of people with specific sets of skills that worked together in analyzing the biodiversity status in Iglicioara Quarry:

- **Alexandra Telea** - Biologist with a master in Biodiversity Conservation
  In charge of managing the team and the inventory and monitoring activities of the quarry, of preparing school presentations and the biodiversity report (birds and herpetofauna)
- **Dragoș Bălășoiu** – Engineer with a master in Biodiversity Conservation
  In charge of inventory and monitoring activities in the quarry and preparing of the biodiversity report (mammal fauna)
- **Marian Tudor** – Biologist with a PhD. In biology
  In charge of preparing the biodiversity report (herpetofauna and overall analysis of the data gathered)
- **Artur Cugut** – Ecologist with a master in Biodiversity Conservation
  In charge of preparing the biodiversity report (analysis of the flora).

We have also revised literature regarding this site, respectively environmental studies made by Telarmed SRL in 2013, 2014, 2015 and the HeidelbergCement Biodiversity Management Plan published in 2014.

**3.2.** For **the first objective** of the project we established a data collection methodology for each category of species. The methodology consisted in active searching of fauna, transects and fixed points. Because of different activity patterns, we had to split the methodology in day and night monitoring activities. Flora data was collected based on visual observation and photographs. Fauna data was collected based on direct visual and acoustic observations and some identifications were made based on marks: excrements, paw prints, shedding and nests.

There were a total of 8 visits in the quarry for inventory and monitoring: 2 in April, 2 in May, 2 in June, one in August, one in September.

### 3.2.1. Diurnal methodology

During day activities for biodiversity inventory and monitoring we used the transects and the active search methods. The transects method implies moving along a path and recording species occurrences. We chose two transects: Transect 1 for the old inactive quarry and Transect 2 for the active quarry and the utilities and plant area.

In order to cover more ground area and to collect more data, we carried out active search sessions of about 20 minutes each. These sessions were carried out along the transects, at a distance of maximum 30m from the transect and we also included a visit to specific interest objectives (such as possible nesting areas, wet areas and mixt habitats on site).

During the diurnal inventory and monitoring activities we have also used the vantage point method in monitoring birds. We chose the highest point on site for the vantage point and observed the bird activity pattern without any influence on it. This activity was carried out for a few hours every time we visited the quarry during the migration season (April - June).

### 3.2.2. Nocturnal methodology

Night activities were carried out mostly for the inventory of nocturnal species, such as amphibians, owls and mammals.

We only followed Transect 2 (with the exception of the Vantage Point for safety reasons) and established 6 bats monitoring points. We stopped in each fixed point for 15-30 minutes in which time we have recorded the ultrasounds bats emit while active.

### 3.2.3 Biodiversity Report

A biodiversity report with all results gathered from the project regarding flora and fauna will help in raising awareness about the importance of Iglicioara Quarry from a biodiversity-point-of-view and will attract stakeholders interested in rehabilitation and restauration projects in the future. This report will be freely distributed toward anyone interested.

**3.3.** For **the second objective** of the project we targeted the students of Turcoaia School. Information travels faster and more efficiently through children toward family, than through flyers or trying to gather adult denizen to a presentation. We have established contact with Turcoaia School director, Mr. Cătălin Purice early in the project (end of April) and organized together the interactive presentations with students from Turcoaia School. In April - May we prepared the presentation with information gathered until then by our team on site and from literature (environmental studies from Iglicioara Quarry).

**3.4.** For **the third objective** of the project we targeted people who use social media. We have posted information regarding the project and biodiversity from Iglicioara Quarry on our personal blog in Romanian (www.wild-path.com), our Facebook page (www.facebook.com/wildpathadventures) and our personal Facebook profiles. Of course, information about our activities and project have also been posted on the QuarryLifeAward blog (www.quarrylifeaward.com).

## 4. Results

### 4.1. BIODIVERSITY INVENTORY AND MONITORING

Biodiversity richness is directly correlated with habitat diversity. Thus is the case of Iglicioara Quarry which is much more than an active opencast mineral site. Near the operational buildings and in the old quarry area we can find temporary ponds and temporary running water, most probably influenced by ground water levels during the year. A temporary pond also formed in the center of the active quarry floor, during June, but this was an ephemeral pond due to intense precipitation. Iglicioara Quarry is characterized by screes, steep loess and rock faces steppe grasslands, loess steppe grasslands. On its slopes we can find species characteristic to ponto-sarmatic steppes. It is surrounded by agricultural land which influence part of the species growing on the limits of the quarry and also alongside roads we can find anthropogenic herb sands.

In our research we have been able to observe and identify 141 species of plants, 3 species of amphibians, 7 species of reptiles, 67 species of birds and at least 14 species of mammals.

#### 4.1.1. Flora

The composition of the vegetation in Iglicioara Quarry is influenced by the pedologic and climatic conditions from the area and is impacted by the anthropic activity existent here for many years. The vegetation is composed mostly of herbs and shrubs, and only 7 secies of trees (*Ailanthus altissima, Populus nigra, Populus alba, Rosa canina, Lycium barbatum, Crataegus monogyna* and *Paliurus spina-christi*). For the complete species list please see Annex 1 of the Final Report.

In the immediate vicinity of the quarry faces we identified species characteristic to Dobrudja's **steppe grasslands** and **loess steppe grasslands**. Species from Poaceae, Asteraceae, Lamiaceae and Crasulaceae families are dominant. These are small grasses which develop on superficial soil and which are adapted to arid conditions and strong winds. Some of these species even have medicinal properties, such as *Thymus pannonicus*, *Thymus zygioides*, *Alyssum murale, Chamomilla matricaria* or *Linum austriacum.* On the north-western part of the quarry, next to the steppe grasslands, we can also rejoice in a cluster of *Paliurus spina-christi*, a tree species characteristic for the **ponto-sarmatic steppes** habitat.

Another important category of flora is represented by the **ruderal communities** growing on the side of the roads, next to the operational buildings and the plant area. These species are opportunistic and resistant to compaction pressure. These herbs are mostly part of the Asteraceae and Poaceae family.

There are also **signs of overgrazing** on the slopes of the quarry, species such as *Xanthium sp. Eryngium sp., Artemisia sp., Carduus sp.*expanding their territory.

On the faces of both the active and the closed quarry the **vegetation is patchy**, the soil isn't yet covered completely. This is a pioneer vegetation with species such as *Euphorbia seguieriana, Erodium cicutarium, Bassia prostrata, Alyssum allyssoides* and *Sclerochloa dura*. Here and there, small trees and shrubbery grow, such us *Ailanthus altissima, Rosa canina, Crataegus monogyna* and *Vitis vinifera*.

Next to the operational buildings and in the old quarry, the presence of temporary ponds and temporary running waters habitats made it possible for **common mesophytes** to grow, such as *Phragmites communis, Eleocharis palustris, Agrostis stolonifera* and *Echinochloa crus-galli.*

#### 4.1.2. Fauna

Although our main objective was to identify and monitor vertebrates, we also took notice of invertebrates. These are an important trophic resource for most vertebrates and without food, we wouldn't have such a big diversity of vertebrate species.

Most of the invertebrates species are characteristic to meso- and xerotemophile species, and some are species associated mostly with agricultural lands. We noticed around the quarry a lot of butterfly species, such as *Pieris sp., Vanessa sp., Polyommatus sp. etc.*, bees, grasshoppers, cicadas, crickets, ants, spiders, flys and dragonflies (near the temporary ponds).

**Amphibians**

Amphibian species distribution around the quarry area is directly related to the existence of surface water. The European Green Toad (*Bufotes viridis)* is best represented in Iglicioara Quarry, as we found individuals all over the quarry and tadpoles were cramming the ponds near the plant area.

The *Pelophylax* complex was represented in Iglicioara Quarry by both adults, juveniles and tadpoles, but were bound to the water bodies near the buildings and the old quarry area. We identified two species from the *Phelophylax* complex, the Edible Frog (*P. esculenta)* and the Marsh Frog (*P. ridibunda)*.

**Reptiles**

The existence of more than one type of biotomes in Iglicoara Quarry is a favourable factor in the distribution and existence of reptiles. Typical steppe grasslands species such as the Balkan Wall Lizard (*Podarcis tauricus)* and the European Green Lizard (*Lacerta viridis)* can be found on the slopes of the quarry and near the buildings. An interesting discovery is the Balkan Green Lizard (*L. trilineata)*, a rare species in Romania, vulnerable because of habitat loss due to agricultural intensification. This species was represented by a few individuals near the buildings area.

We have also found Caspina Whipsnake (*Dolicophis caspius)* to be roaming the south-eastern slopes of the quarry and near the buildings area. Although not a venomous snake, but actually a useful snake for agriculture as its main food are rodents, this species suffers from human-snake interactions.

Another two species of snake were identified near the temporary pond areas. Only two individuals of Dice Snake (*Natrix tessellata)* were seen in the old quarry and more than 10 individuals of *Dice Snake* and a few of Grass snake (*N. natrix)* near the buildings area. Most of these were adults, but a few juveniles have also been seen.

The best represented species of reptile in Iglicioara Quarry is the Spur-Thighed Tortoise (*Testudo graeca)*. A protected species, it seems to find habitats present in the quarry as most fit for its everyday activities: mating, eating, roaming after food or partners. While on the highest point of the quarry, looking out from the vantage point for birds, we have often been accompanied by these tortoises. Everywhere we went, we were sure to find a *Testudo* going on about its day.

**Birds**

Iglicioara Quarry is overlapped with an important bird migration path, VIA PONTICA. The quarry is on the western limit of the migration path. This is also a reason why the quarry is inside the borders of a Natura2000 avifaunistic protected area, ROSPA0073 “Măcin-Niculițel”. The nearby Danube and the diversity of ecosystems from the whole area: wetlands, agricultural land, forests, shrubs, grasslands etc. make it possible for Iglicioara Quarry to be a good vantage point for observing birds in transit.

We have been able to count 67 species of birds either in migration over Iglicioara Quarry, in transit to their feeding grounds, living nearby the quarry but looking for food or mating partners inside de quarry or even nesting inside the quarry limits. From these, the IUCN RedList mentions the Red-Footed Falcon (*Falco vespertinus)* and the European Roller (*Coracias garrulus)* as Near Thretened, the other 65 species being categorized as Least Concern.

In the Bird Directive of the European Union (Directive 2009/147/EC) 18 species are listed in Annex I (species which need a Special Protection Area (SPAs) designated), 3 species in Annex IIA and IIIA, 1species only in Annex IIA and 10 species in Annex IIB. Annex IIA and IIB lists species that can be hunted and Annex IIIA lists species

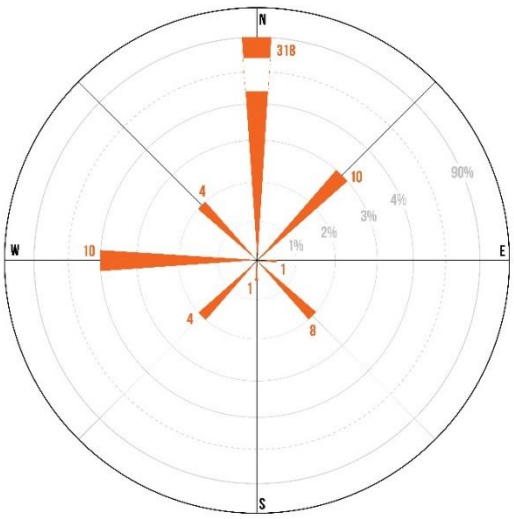
which can be deliberately captured in certain conditions. Romanian legislation, which ratifies the Bird Directive through Governmental Emergency Ordinance 57/2007, lists an extra of 17 species of national interest which need a strict protection. For more information and a complete species list please see Annex 2 to the Final Report.

Around the quarry there are nesting sites for several species of birds. The European Bee-Eater (*Merops apiaster),* Sparrows *(Passer sp.),* Common Starlings (*Sturnus vulgaris*), thhe European Roller (C. garrulus) and the Little Owl (*Athene noctua)* nest on the limit of the quarry in a loess steep face. We found a Sterling nest on the south-eastern slope of the quarry in an old abandoned building. A Syrian Woodpecker (*Dendrocopos syriacus)* nests in a tree near the loess face where the European bee-eaters nest. The Long-legged Buzzard (*Buteo rufinus)* has a false nest on one of the eastern steep rock faces in the active quarry. Although we haven't seen the pair nesting here, this false nest is visible and the pair often took flight from there when we came near. Multiple pairs of Wheatears (*Oenanthe oenanthe)* displayed mating and nest protection behavior in the active quarry floor when we approached rock gatherings. Larks (*Galerida cristata* and *Alauda arvensis)* diplayed mating behavior on the south-eastern slope of the quarry and in august we have even been able to see juveniles on the side of the road. Rook (*Corvus frugilegus)*, Eurasian Doves (*Streptopelia decaocto),* Sparrows *(Passer montanus, Passer domesticus)* nests can be seen in the grove with *Populus sp.* and near the building area. In June we had a nice surprise: in the sand deposits, near the plant area, a colony of over 300 Sand Martins (*Riparia riparia)* built their nests. Although the quarry was active and new material was deposited there, the colony continued its activity and left by the end of July. Also, a pair of Common Kestrel (*Falco tinnunculus)* nests in the old quarry area.

Other interesting findings regard the old quarry area: Because there is almost no human activity here, we had the opportunity to observe two more timid species (and rare for Romania) such as the Pied Wheatear (*Oenanthe pleschanka)* and the Common Rock Thrush (*Monticola saxatilis).* For the later we have seen even a mating behavior in the area.

Also in the old quarry, in the temporary ponds, we have seen a Grey Heron (*Ardea cinerea)* and Mallards (*Anas platyrhynchos).*

From the Vantage Point we have been able to observe in spring a group of 50 Storks (*Ciconia ciconia)* and a group of over 250 Great White Pelicans (*Pelecanus onocrotalus)* migrating North. With these exceptions, we have seen only singular individuals of another 12 species of raptors and 3 species of aquatic bird species in migration, or transiting the area in search for food.




**Migration directions and no of birds (larger image in Annex)**

**Other investigations for birds**

Talking with Iglicioara Quarry workers and manager Mr. C. Rotaru, we have found out that in the past the temporary ponds were visited by species such as egrets and sandpipers.

Thus we made a visit to nearby agricultural lands that were near to the Danube and to nearby wetlands (maximum one kilometer to the north of the quarry). We found here Black Storks (*Ciconia nigra),* Greylag Goose *(Anser anser),* Garganey (*Anas querquedula),* Mallards (*Anas platyrhynchos),* Ruddy Shellducks (*Tadorna ferruginea),* Ruffs (*Philomachus pugnax)* and an albino Long-Legged Buzzard observed from the vantage point a month earlier.

**Mammals**

The mammals observed where usually active at night, when human activity was at its lowest. Species adapted to anthropic activity, such as Hares (*Lepus europaeus)* and Foxes (*Vulpes vulpes)* where often found inside the active quarry and on its slopes. The hare was seen even in daylight in April and May.

Other species such as Badgers (*Meles meles)*, Steppe polecats (*Mustela eversmanni),* Martens (*Martens martens)* and Least Weasels (*Mustela nivalis)* were identified based on their paw marks, excrements and burrows. Foxes and Badger burrows were also found near the loess steep face where European bee-eaters nest. Unfortunately, these burrows were destroyed in late summer due to human loess collection from the area. Also, Steppe Mouse (*Mus spicilegus)* individuals were seen during the night in the old quarry. On the south-eastern slopes of the quarry we have often met face-to-face with Ground Squirrels (*Spermophillus citellus*) that ran all over the place in hiding from raptors.

The abundance of roosting sites in close proximity to the quarry makes the site a highly transited area by bats. Based on the ultrasounds we have recorded, they not only pass by, but also actively hunt above the quarry. We identified the following species: Pipistrelle Bats (*Pipistrellus kuhlii/nathusii), Myotis sp,* Common Noctule (*Nyctalus noctula),* Serotine Bat (*Eptesicus serotinus)* and Grey Long-Eared Bats (*Plecotus austriacus)*. Due to the fact the identifications are based on the ultrasounds alone there are a few limitations: there is very little difference between *Pipistrellus kuhlii* and *Pipistrellus nathusii*, as well as in the case of the species of the *Myotis* genus.

### 4.1.3. Biodiversity report

All the data was analysed in a Biodiversity report about Iglicioara Quarry. The report will be distributed to interested stakeholders as part of the follow-up of the project. This report has the goal to raise awareness of the rich biodiversity in Iglicioara Quarry and to be a basis for future rehabilitation and restauration projects in the area.

## 4.2. RAISING AWARENESS

### 4.2.1. Turcoaia denizens

The first objective was to raise awareness throughout Turcoaia village in order to bring denizens closer to nature and to make them see the importance of Iglicioara Quarry from a biodiversity-point-of-view too. Because information is spread more easily from children to adults, we have organized together with Turcoaia School director, Mr. Cătălin Purice, interactive presentations for students from the 3rd to the 7th grade (ages 9-14 year old).

We had the oportunity to hear stories about human-biodiversity meetings in the Iglicioara Quarry area from over 200 pupils. The children had the opportunity to learn more about the importance of quarries in day-to-day human

activities, to learn about Iqlicioara Quarry and it's biodiversity. They showed advanced knowledge about medicinal plants around the Quarry and also about some of the more common animals found there.

100% of the children concluded at the end of the presentations that there are ways in which a quarry can also positively impact the environment, but humans need to be careful how they manage their activities and that after the quarry closes to help nature a little bit in its revival. They proposed tree and herbs to be planted after the quarry closes and some even said that parts of the quarry should be left undisturbed as nature always finds a way.

#### 4.2.2. Social media

We published over 20 facebook post with multiple shares per post, many reaching close to 1000 people. There was an incredible feedback, getting lots of questions and attention. Almost every person we talked to was amazed by the rich biodiversity a quarry can have. The blog post published both on www.quarrylifeaward.com and on www.wild-path.com were shared on facebook for additional reach.

## 5. Conclusions

- Iglicioara Quarry is most remarkable because it encompasses a number of diverse habitats: temporary ponds and temporary running water, steppe grasslands, loess steppe grasslands, ponto-sarmatic steppes, screes, rock and loess faces, a mosaic of bare ground and patchy vegetation, antrhopogenic herb stands, planted grove etc.
- 141 species of plants identified in Iglicioara Quarry, from which 7 are trees.
- 3 species of amphibians, from which one found all over the quarry area. All three are listed in the Habitat Directive of the European Union, *B. viridis* in Annex IV and the other two in Annex V.
- 7 species of reptiles. Only the Grass Snake (*Natrix natrix)* isn't mentioned in the Habitat Directive of the European Union, Annex IV. The Greek Tortoise (*Tesudo graeca)* also mentioned in Annex II.
- 67 species of birds from which 27 mentioned in the Bird Directive and another extra 17 mentioned in Romanian legislation.
- 17 species of birds were seen in migration from the Vantage Point and at least another 15 showed mating behaviors in the quarry area.
- At least 8 species of mammals, with the exception of bats. From these, at least 5 species have burrows in the quarry area. Only the Ground Squirrel mentioned in Annex II and the martens in Annex V of the Habitat Directive.
- At least 6 bat species which roam the quarry in search for food, all of them listed in the Habitat Directive, either in Annex II or Annex IV.
- Over 200 pupils from Turcoaia village (ages 9 to 14 years old) have participated in an interactive presentation about Iglicioara Quarry's importance from a biodiversity-point-of-view.
- Over 5000 people reached through social media about Iglicioara Quarry.

## Discussion & Follow-up

**More species**

We have to specify that for sure there are more species of fauna and flora than we have counted. For the flora we have done only inventory of species observed and identified on the transects we followed. For the fauna, based on denizens description and local history, there is the posibility of a false absence of some species of reptiles, such as the Blotched Snake (*Elaphe sauromates)*. Also we're missing the autumn migration season and the wintering period for birds, so the list surely is bigger than what we have listed in Annex 2.

**Reconstruction and Rehabilitation Ideas**

Based on all the data we gathered reconstruction ideas can already be outlined. The key concept is to use the elements already there – be them created by nature alone or by man's tools.

Shown in the above image is the scenery from part of the old quarry area, where a temporary pond already forms. If the steep rock face would be planted here and there with small, saxicolous plants and small trees such as *Crategus monogyna* it would already be a change in scenery. Plant a few other trees - such as Ash (*Fraxinus excelsior*), Hornbean (*Carpinus orientalis)* and willows (*Salix sp.*) near the temporary pond – the old quarry would be able to be reintegrated in the general lanscape of Northern Dobruja, it would provide a biotome for a series of species and it would also be a nice place to take a stroll.

**Biodiversity Report on Iqlicioara Quarry**

We have written a more comprehensive analysis on the biodiversity we have encountered in Iqlicioara Quarry. This report will be shared to stakeholders and people interested in our research. We hope that the data we gathered will be used in future proper reconstruction and rehabilitation projects in the area.

**Further activities for Raising Awareness**

Once the universitary school year starts, we shall establish sessions with students from Biology, Ecology, Geography where we will talk about biodiversity in quarries, about Iglicioara Quarry and why it is important for biodiversity, about this project and how can students participate in rehabilitation and reconstruction projects in quarries such as Iglicoara.

**Project tags (select all appropriate):**

This will be use to classify your project in the project archive (that is also available online)

Project focus:

- ☐Biodiversity management
- ☐Cooperation programmes
- ☒Education and Raising awareness
- ☒Endangered and protected species
- ☐Invasive species
- ☐Landscape management - rehabilitation
- ☐Rehabilitation
- ☒Scientific research
- ☐Soil management
- ☐Urban ecology
- ☐Water management

Flora:

- ☐Conifers and cycads
- ☐Ferns
- ☒Flowering plants
- ☐Fungi
- ☐Mosses and liverworts

Fauna:

- ☒Amphibians
- ☒Birds
- ☒Dragonflies & Butterflies
- ☐Fish
- ☒Mammals
- ☒Reptiles
- ☐Spiders
- ☒Other insects
- ☒Other species

Habitat:

- ☐Cave
- ☐Cliffs
- ☒Fields - crops/culture
- ☐Forest
- ☒Grassland
- ☐Human settlement
- ☒Open areas of rocky grounds
- ☐Recreational areas
- ☒Screes
- ☒Shrubs & groves
- ☒Soil
- ☐Wander biotopes
- ☒Water bodies (flowing, standing)
- ☐Wetland

Stakeholders:

- ☒Authorities
- ☒Local community
- ☐NGOs
- ☒Schools
- ☒Universities

# ANNEXES

## Annex 1

## Flora Species List

| | Order | Family | Scientific name |
|---|---|---|---|
| 1. | RANUNCULALES | Ranunculaceae | *Consolida regalis* |
| 2. | | | *Nigella arvensis* |
| 3. | PAPAVERALES | Papaveraceae | *Papaver rhoeas* |
| 4. | | | *Papaver dubium* |
| 5. | CARYOPHYLLALES | Amaranthaceae | *Amaranthus retroflexus* |
| 6. | | Portulacaceae | *Portulaca oleracea* |
| 7. | | Caryophyllaceae | *Herniaria glabra* |
| 8. | | | *Scleranthus perennis* |
| 9. | | | *Cerastium semidecandrum* |
| 10. | | | *Dianthus nardiformis* |
| 11. | | | *Holosteum umbellatum* |
| 12. | | Chenopodiaceae | *Bassia prostrata* |
| 13. | | | *Bassia scoparia* |
| 14. | | | *Salsola kali* |
| 15. | | | *Chenopodium album* |
| 16. | POLYGONALES | Polygonaceae | *Polygonum aviculare* |
| 17. | ROSALES | Crasulaceae | *Sedum urvillei ssp. hillebrandtii* |
| 18. | | | *Sedum caespitosum* |
| 19. | | Rosaceae | *Rosa canina* |
| 20. | | | *Crataegus monogyna* |
| 21. | | | *Sanguisorba minor* |
| 22. | | | *Potentilla argentea* |
| 23. | | | *Agrimonia eupatoria* |
| 24. | FABALES | Fabaceae | *Medicago falcata* |
| 25. | | | *Medicago minima* |
| 26. | | | *Medicago sativa* |
| 27. | | | *Medicago lupulina* |
| 28. | | | *Trifolium arvense* |
| 29. | | | *Trifolium campestre* |
| 30. | | | *Trifolium repens* |
| 31. | | | *Melilotus officinalis* |
| 32. | | | *Coronilla varia* |
| 33. | | | *Lathyrus tuberosus* |
| 34. | RUTALES | Simaroubaceae | *Ailanthus altissima* |
| 35. | LINALES | Linaceae | *Linum austriacum* |
| 36. | GERANIALES | Geraniaceae | *Erodium cicutarium* |
| 37. | | Zygophyllaceae | *Tribulus terrestris* |
| 38. | RHAMNALES | Rhamnaceae | *Paliurus spina-christi* |
| 39. | | Vitaceae | *Vitis vinifera* |
| 40. | EUPHORBIALES | Euphorbiaceae | *Euphorbia seguieriana* |
| 41. | APIALES | Apiaceae | *Daucus carota ssp. carota* |
| 42. | | | *Eryngium campestre* |

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| 43. | CAPPARALES | Resedaceae | *Reseda lutea* |
| 44. | (CRUCIFERALES) | Brassicaceae | *Sisymbrium loeselii* |
| 45. | | | *Sisymbrium officinale* |
| 46. | | | *Alyssum allysoides* |
| 47. | | | *Alyssum hirsutum* |
| 48. | | | *Alyssum murale* |
| 49. | | | *Berteroa incana* |
| 50. | | | *Capsella bursa-pastoris* |
| 51. | | | *Cardaria draba* |
| 52. | | | *Diplotaxis tenuifolia* |
| 53. | | | *Erysimum repandum* |
| 54. | | | *Erophila verna* |
| 55. | | | *Rapistrum perenne* |
| 56. | PRIMULALES | Primulaceae | *Anagallis arvensis* |
| 57. | | | *Anagallis foemina* |
| 58. | | | *Androsace maxima* |
| 59. | GENTIANALES | Rubiaceae | *Galium aparine* |
| 60. | | | *Asperula cynanchica* |
| 61.. | | Asclepiadaceae | *Cynanchum acutum* |
| 62. | DISPACALES | Dipsacaceae | *Scabiosa ochroleuca* |
| 63. | POLEMONIALES | Convolvulaceae | *Convolvulus arvensis* |
| 64. | | | *Convolvulus cantabrica* |
| 65. | | Boraginaceae | *Heliotropium europaeum* |
| 66. | | | *Myosotis stricta* |
| 67. | | | *Echium vulgare* |
| 68. | | | *Lappula squarrosa* |
| 69. | | | *Cynoglossum officinale* |
| 70. | | | *Onosma visianii* |
| 71. | | | *Lycopsis (Anchusa) arvensis* |
| 72. | | | *Lithospermum arvense* |
| 73. | LAMIALES | Lamiaceae | *Ajuga chamaepytis* |
| 74. | | | *Ballota nigra* |
| 75. | | | *Teucrium polium ssp. capitatum* |
| 76. | | | *Marrubium peregrinum* |
| 77. | | | *Marrubium vulgare* |
| 78. | | | *Salvia nemorosa* |
| 79. | | | *Lamium amplexicaule* |
| 80. | | | *Sideritis montana* |
| 81. | | | *Thymus pannonicus* |
| 82. | | | *Thymus zygioides* |
| 83. | SOLANALES | Solanaceae | *Solanum nigrum* |
| 84. | | | *Datura stramonium* |
| 85. | | | *Lycium barbarum* |
| 86. | | Scrophulariaceae | *Verbascum banaticum* |
| 87. | | | *Linaria genistifolia* |
| 88. | | | *Veronica austriaca* |

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| 89. | | | *Veronica hederifolia* |
| 90. | | | *Veronica polita* |
| 91. | PLANTAGINALES | Plantaginaceae | *Plantago lanceolata* |
| 92. | ASTERALES | Asteraceae | *Erigeron annuus* |
| 93. | | | *Bidens frondosa* |
| 94. | | | *Xanthium strumarium* |
| 95. | | | *Xanthium italicum* |
| 96. | | | *Achillea setacea* |
| 97. | | | *Achillea coarctata* |
| 98. | | | *Matricaria perforata* |
| 99. | | | *Matricaria chamomilla* |
| 100. | | | *Tanacetum vulgare* |
| 101. | | | *Artemisia austriaca* |
| 102. | | | *Artemisia scoparia* |
| 103. | | | *Artemisia vulgaris* |
| 104. | | | *Senecio vernalis* |
| 105. | | | *Senecio jacobaea* |
| 106. | | | *Xeranthemum annuum* |
| 107. | | | *Arctium lappa* |
| 108. | | | *Carduus thoermeri* |
| 109. | | | *Carduus acanthoides* |
| 110. | | | *Cirsium vulgare* |
| 111. | | | *Onopordum acanthium* |
| 112. | | | *Centaurea diffusa* |
| 113. | | | *Chondrilla juncea* |
| 114. | | | *Taraxacum officinale* |
| 115. | | | *Sonchus arvensis* |
| 116. | | | *Cichorium intybus* |
| 117. | | | *Conyza canadensis* |
| 118. | LILIALES | Liliaceae | *Ornithogalum amphibolum* |
| 119. | | | *Ornithogalum umbellatum* |
| 120. | | | *Gagea bulbifera* |
| 121. | | | *Muscari neglectum* |
| 122. | CYPERALES | Cyperaceae | *Eleocharis palustris* |
| 123. | GRAMINALES | Poaceae | *Apera spica-venti* |
| 124. | | | *Schlerochloa dura* |
| 125. | | | *Cynodon dactylon* |
| 126. | | | *Dichanthium (Bothriochloa) ischemum* |
| 127. | | | *Festuca valesiaca* |
| 128. | | | *Hordeum murinum* |
| 129. | | | *Hordeum marinum* |
| 130. | | | *Melica ciliata* |
| 131. | | | *Bromus hordacaeus* |
| 132. | | | *Bromus sterillis* |
| 133. | | | *Bromus tectorum* |
| 134. | | | *Poa bulbosa* |

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| 135. | | | *Agrostis stolonifera* |
| 136. | | | *Calamagrostis epigejos* |
| 137. | | | *Eragrostis minor* |
| 138. | | | *Echinochloa crus-galli* |
| 139. | | | *Setaria pumila* |
| 140. | SALICALES | Salicaceae | *Populus alba* |
| 141. | | | *Populus nigra* |

**Annex 2**

**Fauna Species List**

# Amphibians

| | Order | Common name | Directive 92/43/CEE | IUCN | OUG 57/2007 |
|---|---|---|---|---|---|
| 1 | **Anura** | *Bufotes viridis* (european green toad) | Annex 4 | LC | Annex 4A |
| 2 | | *Pelophylax esculenta* (edible frog) | Annex 5 | LC | Annex 5 |
| 3 | | *Pelophylax ridibunda* (marsh frog) | Annex 5 | LC | Annex 4B, 5 |

# Reptiles

| | Order | Common name | Directive 92/43/CEE | IUCN | OUG 57/2007 |
|---|---|---|---|---|---|
| 1 | **Squamata** | *Podarcis tauricus* (Balkan wall lizard) | Annex 4 | LC | Annex 4A |
| 2 | | *Lacerta viridis* (European green lizard) | Annex 4 | LC | Annex 4A |
| 3 | | *Lacerta trilineata* (Balkan green lizard) | Annex 4 | LC | Annex 4A |
| 4 | | *Natrix natrix* (Grass snake) | - | LC | - |
| 5 | | *Natrix tessellata* (Dice snake) | Annex 4 | LC | Annex 4A |
| 6 | | *Dolichophis caspius* (Caspian whipsnake) | Annex 4 | - | Annex 4A, 4B |
| 7 | **Testudines** | *Testudo graeca* (Greek tortoise) | Annex 2, 4 | V | Annex 3, 4A |

# BIRDS

| | Order | Scientific name (Common name) | Directive 2009/147/EC | IUCN | OUG 57/2007 |
|---|---|---|---|---|---|
| 1 | **Ciconiformes** | *Ciconia ciconia* (White Stork) | Annex 1 | LC | Annex 3 |
| 2 | | *Ciconia nigra* (black stork) | Annex 1 | LC | Annex 3 |
| 3 | **Pelecaniformes** | *Pelecanus onocrotalus* (great white pelican) | Annex 1 | LC | Annex |
| 4 | | *Phalacrocorax carbo* (great cormorant) | - | LC | - |
| 5 | **Anseriformes** | *Anas platyhrynchos* (mallard) | Annex 2A, 3A | LC | Annex 5C |
| 6 | | *Tadorna ferruginea* (ruddy shelduck) | Annex 1 | LC | Annex 3 |
| 7 | | *Ardea cinerea* (grey heron) | - | LC | - |
| 8 | **Falconiformes** | *Accipiter nisus* (Eurasian sparrowhawk) | - | LC | - |
| 9 | | *Accipiter gentilis* (northern goshawk) | - | LC | - |
| 10 | | *Aquila pomarina* (lesser spotted eagle) | Annex 1 | LC | Annex 3 |
| 11 | | *Buteo buteo* (common buzzard) | - | LC | - |
| 12 | | *Buteo rufinus* (long-legged buzzard) | Annex 1 | LC | Annex 3 |
| 13 | | *Circus aeruginosus* (western marsh harrier) | Annex 1 | LC | Annex 3 |
| 14 | | *Hieraaetus pennatus* (booted eagle) | Annex 1 | LC | Annex 3 |
| 15 | | *Milvus migrans* (black kite) | Annex 1 | LC | Annex 3 |
| 16 | | *Pandion halietus* (osprey) | Annex 1 | LC | Annex 3 |
| 17 | | *Falco tinnunculus* (common kestrel) | - | LC | Annex 4B |
| 18 | | *Falco subbuteo (Eurasian hobby)* | - | LC | Annex 4B |
| 19 | | *Falco vespertinus* (red-footed falcon) | Annex 1 | NT | Annex 3 |
| 20 | **Strigiformes** | *Athene noctua* (little owl) | - | LC | Annex 4B |
| 21 | **Coraciiformes** | *Coracias garrulus* (European roller) | Annex 1 | NT | Annex 3 |
| 22 | | *Merops apiaster* (European bee-eater) | - | LC | Annex 4B |
| 23 | | *Upupa epops* (Common Hoopoe) | - | LC | Annex 4B |
| 24 | **Cuculiformes** | *Cuculus canorus* (common cuckoo) | - | LC | - |
| 25 | **Piciformes** | *Dendrocopos syriacus* (Syrian woodpecker) | Annex 1, **3** | LC | Annex 3 |

| | | | | | |
|---|---|---|---|---|---|
| 26 | | *Dendrocopos medius* (middle spotted woodpecker) | - | LC | Annex 3 |
| 27 | **Columbiformes** | *Columba palumbus* (common wood pigeon) | Annex 2A,3A | LC | Annex 5 |
| 28 | | *Columba livia domestica* (domestic pigeon) | Annex 2A | LC | Annex 5 |
| 29 | | *Streptopelia turtur* (European turtle dove) | Annex 2B | LC | Annex 5 |
| 30 | | *Streptopelia decaocto* (Eurasian collared dove) | Annex 2B | LC | Annex 5 |
| 31 | **Passeriformes** | *Alauda arvensis* (Eurasian skylark) | Annex 2B | LC | Annex 5 |
| 32 | | *Galerida cristata* (Crested Lark) | - | LC | - |
| 33 | | *Melanocorypha calandra* (calandra lark) | Annex 1 | LC | Annex 3 |
| 34 | | *Corvus frugilegus* (rook) | Annex 2B | LC | Annex 5 |
| 35 | | *Corvus corone cornix* (carrion crow) | Annex 2B | LC | Annex 5 |
| 36 | | *Corvus monedula* (western jackdaw) | Annex 2B | LC | Annex 5 |
| 37 | | *Corvus corax* (Common raven) | - | LC | Annex 4B |
| 38 | | *Pica pica* (Eurasian magpie) | Annex 2B | LC | Annex 5 |
| 39 | | *Miliaria calandra* (corn bunting) | - | LC | Annex 4B |
| 40 | | *Parus major* (great tit) | - | LC | - |
| 41 | | *Cyanistes (Parus) caeruleus* (blue tit) | - | LC | - |
| 42 | | *Carduelis carduelis* (European goldfinch) | - | LC | Annex 4B |
| 43 | | *Carduelis cannabina* (Common Linnet) | - | LC | Annex 4B |
| 44 | | *Chloris chloris* (European greenfinch) | - | LC | Annex 4B |
| 45 | | *Fringilla coelebs* (common chaffinch) | - | LC | Annex 4B |
| 46 | | *Hirundo rustica* (barn swallow) | - | LC | - |
| 47 | | *Delichon urbicum* (common house martin) | - | LC | - |
| 48 | | *Riparia riparia* (sand martin) | - | LC | - |
| 49 | | *Lanius collurio* (red-backed shrike) | Annex 1 | LC | Annex 3 |
| 50 | | *Lanius minor* (lesser grey shrike) | Annex 1 | LC | Annex 3 |
| 51 | | *Anthus campestris* (tawny pipit) | Annex 1 | LC | Annex 3 |
| 52 | | *Motacilla flava* | - | LC | Annex 4B |

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|---|---|---|---|---|---|
| | | (western yellow wagtail) | | | |
| 53 | | *Motacilla alba* (white wagtail) | - | LC | Annex 4B |
| 54 | | *Oenanthe oenanthe* (northern wheatear) | - | LC | - |
| 55 | | *Oenanthe isabellina* (isabelline wheatear) | - | LC | - |
| 56 | | *Oenanthe pleschanka* (pied wheatear) | Annex 1 | LC | Annex 3 |
| 57 | | *Monticola saxatilis (common rock thrush)* | - | LC | Annex 4B |
| 58 | | *Erithacus rubecula* (European robin) | - | LC | Annex 4B |
| 59 | | *Phoenicurus ochruros* (black redstart) | - | LC | Annex 4B |
| 60 | | *Saxicola rubetra* (whinchat) | - | LC | - |
| 61 | | *Passer domesticus* (house sparrow) | - | LC | - |
| 62 | | *Passer hispaniolensis (Spanish sparrow)* | - | LC | Annex 4B |
| 63 | | *Passer montanus* (Eurasian tree sparrow) | - | LC | - |
| 64 | | *Sturnus vulgaris* (common starling) | Annex 2B | LC | Annex 5C |
| 65 | | *Turdus merula* (common blackbird) | Annex 2B | LC | Annex 5C |
| 66 | | *Turdus philomelos* (song thrush) | Annex 2B | LC | Annex 5C |
| 67 | **Galliformes** | *Phasianus colchicus* (common pheasant) | Annex 2A,3A | LC | Annex 5C |

# Mammals

| | Order | Common name | Directive 92/43/CEE | IUCN | OUG 57/2007 |
|---|---|---|---|---|---|
| 1 | **Carnivora** | *Meles meles* (European badger) | - | LC | Annex 5 |
| 2 | | *Mustela nivalis* (Least weasel) | - | LC | Annex 5 |
| 3 | | *Martens martens* (European pine martens) | Annex 5 | LC | Annex 5 |
| 4 | | *Mustela eversmanni* (Steppe polecat) | - | LC | Annex 3, 4A |
| 5 | | *Vulpes vulpes* (Red fox) | - | LC | Annex 5 |
| 6 | **Rodentia** | *Mus spicilegus* (Steppe mouse) | - | LC | - |
| 7 | | *Spermophilus citellus* (European ground squirrel) | Annex 2 | V | Annex 3, 4A |
| 8 | **Lagomorpha** | *Lepus europaeus* (European hare) | - | LC | Annex 4A, 5 |
| 9 | **Chiroptera** | *Pipistrellus kuhlii* (Kuhl's Pipistrelle) | Annex 4 | LC | Annex 4A |
| 10 | | *Pipistrellus nathusii* (Nathusius' Pipistrelle) | Annex 4 | LC | Annex 4A |
| 11 | | *Nyctalus noctula* (Common noctule) | Annex 4 | LC | Annex 4A |
| 12 | | *Eptesicus serotinus* (Serotine bat) | Annex 4 | LC | Annex 4A |
| 13 | | *Myotis sp.* | Annex 2, 4 | LC / DD / V | Annex 3, 4A |
| 14 | | *Plecotus austriacus* (Grey long-eared bat) | Annex 4 | LC | Annex 4A |

## Annex 3

## Reconstruction and Rehabilitation Ideas

Based on the existing habitats in Iglicioara Quarry, we thought of 2 ideas that show how easy it can be to reconstruct and rehabilitate the site.

### 1. Old Quarry Area

In the old quarry there is already a temporary pond formed when the ground water has a high level. This is the site were we have seen Mallards (*Anas platyrhynchos)* and Grey Herons (*Ardea cinerea).* The habitat is similar to that of the surrounding wetlands where we have observed Black Storks (*Ciconia nigra),* Greylag Goose *(Anser anser),* Garganey (*Anas querquedula),* Mallards (*Anas platyrhynchos),* Ruddy Shellducks (*Tadorna ferruginea),* Ruffs (*Philomachus pugnax*)*.*

With proper rehabilitation, this site can be an oasis for bird species usually known for their relationship to water bodies. It could also remain an important site for Wheatears and the Common Rock Thrush, which we have already seen taking residence here.

First the steep face of the old quarry should be planted with saxicolous species. This might not be necessary in the future as nature already started the process of sowing plants on the face.

The temporary pond can be managed to assure the differentiation of different habitats and to avoid flooding the nearby soil.

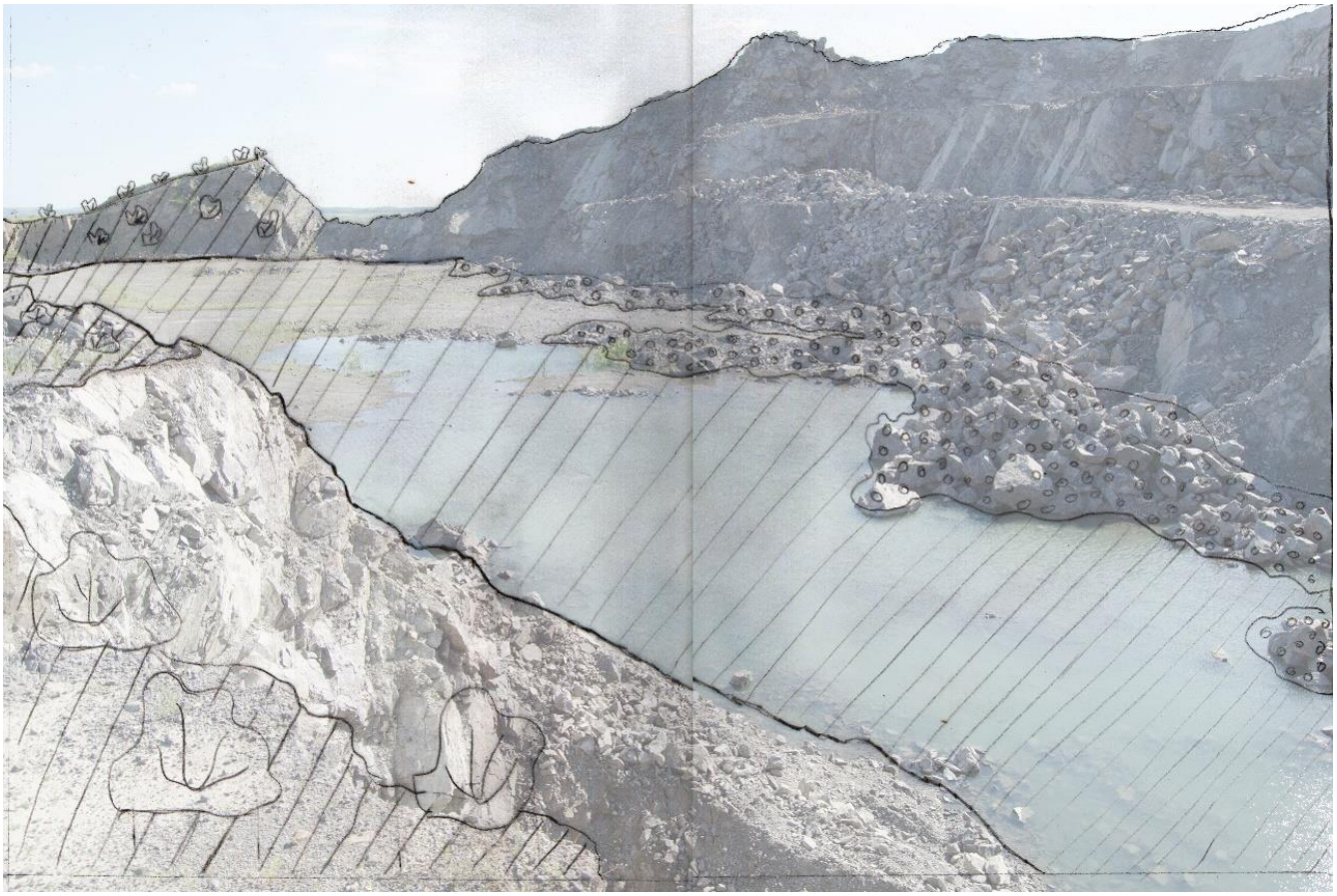
On the top of the face, to assure the rigidity of the soil, small trees such as Common Hawthorn (*Crataegus monogyna)* or Wild Pear (*Pirus piraster*) can be planted.

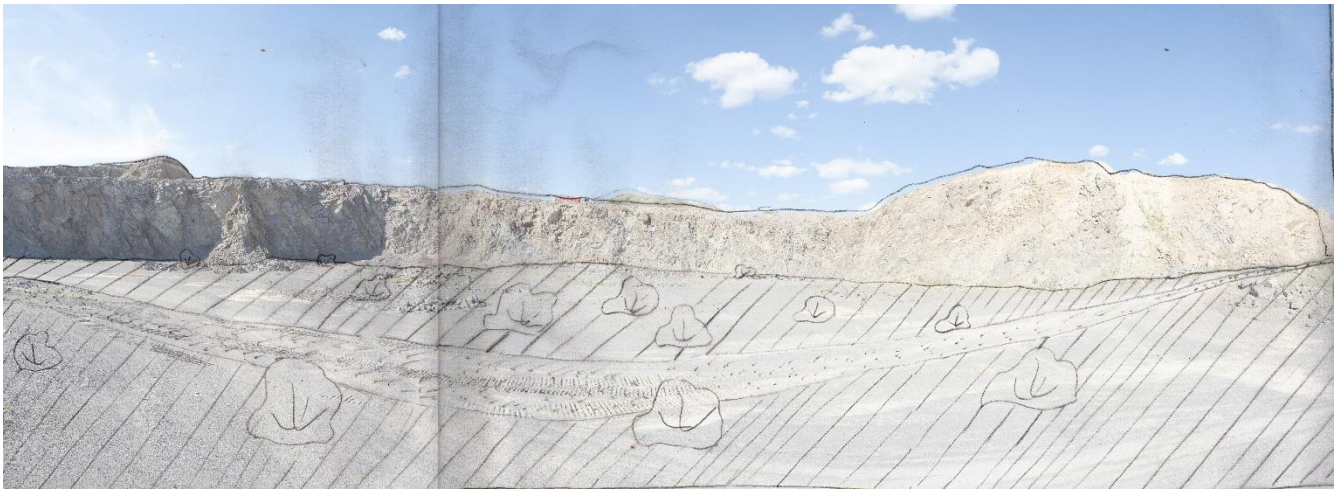
In a few years trees such as Ash (*Fraxinus excelsior)* and Hornbean (*Carpinus orientalis)* can be planted on the floor of the old quarry.

Nearby the pond species such as Willows (*Salix sp.*) or Russian Olives (*Eleagnus angustifolia)* can be planted to create a nice landscape, an oasis of calm and relaxation for humans and nature.

## 2. Active Quarry Area

Although active, parts of the Quarry Active Area can already be rehabilitated with little to no effort.





As you can see, it is enough to resoil the floor of Iglicioara Quarry and sow with wild species. The next step is to plant here and there a few small trees, such as Common Hawthorn (*Crataegus monogyna)* or Wild Pear (*Pirus piraster*). The steep rock and loess faces should be left as they are, maybe just for human safety to plant a green fence formed out of thorny bushes.