# HELLWEG-STONESHEEP

Project report for: The quarry life award

editor:
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## Abstract

To care calcareous-low-nutrient-meadow-complexes in abandoned and active quarries in the south of Geseke on areas of HeidelbergCement AG sheep have been used since 2009. Within the framework of the project „Hellweg-Stonesheep" an independent race of landscape-sheep is breeded, which is specialised on extreme habitates, the conditions of nature-protection for care of CLNMC and the extensive form of sheep-rearing.

Three years after the start of the project first potential interim results have been obtained, which will be introduced in this report. So the project on a good way and is planned to be extended.

## Introduction

The development and extension of excavation-projects in many regions meet with massive resistance of the population and also of legal regulations for example through the Federal Nature Conservation Act. With modern concepts of renaturation, companies and approving authorities, react on this and often assign the affected areas after finishing excavation, the function of areas of compensation. Also old-excavations move into public interest and have already been protected as conservation area in many places. The preservation and care of these areas more and more change into a duty of the industry of excavations. By cooperation with agriculture, local environmentalists and regional care concepts significant expenses can be saved by the companies. Nature protection concepts can be transformed and at many places the problems of acceptance decrease.

For the last 120 years lime and cement have been produced industrially in Geseke. The companies, which were originally mid-sized, have been meanwhile replaced by two international concerns (HeidelbergCement AG and Dyckerhoff AG). Thus south of the city is shaped by numerous quarries, some of them have been abandoned for 80 years. A comprehensive framework development planning the 2004 created a „concept of after-use proposal for limestone mining", with its integrative approach has resulted into a consensus between the participants and found new ways for the development of the excavation region.

## Objectives

Aim of the project „Hellweg-Stonesheep" is the breeding a race which can adapt itself to extreme situations , robust sheep for taking care of calcareous low nutrient meadow-complexes in abandoned and active quarries of the region.

Concerning of the field of application the following attributes have been set as breeding purposes:

- race, which in addition to the phenotypic attraction, also can be kept under extensive conditions
- colour: uni coloured brown to grey
- rams with horns
- ewe without or with small horns
- rams up to 80 - 100 kg live-weight
- ewe up to 55 - 75 kg live weight
- hairsheep with short hair in summer and short, densed winterfleece (3-5 cm). In spring natural winter shed fur. No sheep sheering!

On several areas with different structure of vegetation the animals shall be surveyed concerning their influence on the low-nutrient meadows to conclude to grazing-management and caring-costs.

With the breeding of recognizable sheep-race the „Hellweg-Stonesheep" is supposed to act as a figure of popularity.

Fig. 1: Groop of visitors with Amy Wedel from the international organisation team of the Quarry-life-award at August, 2nd 12
Foto: Dorothee Weber

## Background-information

### Location

Geseke is a town in the district of Soest in the eastern part of Northrhine-Westfalia. It has about 20.000 inhabitants. Since 1890 lime and cement have been produced industrially. Reason for that is a deposit of limestone-marl of late cretaceous, which breaks the surface at the southern edge of the "Münsterländer" basin in the area of the "Haarstrang", a low leveled mountain range. Combined with neighbour cities Erwitte and Paderborn it has become Germanys largest „cement-district".

The name „Hellweg" has its origin in the middle ages, when it was an important an extensive trade route linking eastern and western Europe.

### After-use proposal for limestone mining in Geseke

Folgenutzungskonzept Geseke (FNK)

As a result of the FNK for he quarries in Geseke since 2004 its participants have build a basis for a continuation of the over 100 years lasting industrial use of the limestone-resources. The concept and its additions regulate:

1. A coordinated enduring **frame-planning** for the future mineral extraction sites.
   Result: Takeover in local zoning plan and regional planning.
2. A specification of the **subsequent use** for the quarries, existing and planned, on the basis of a location assessment.
3. Result: Reservation of approx. 50 % of the excavation area for nature conservation, use of the other areas for trades or recreation.
4. A specification of the frame-concept for the „**nature protected-quarries**" for developing and caring of these areas.
   Result: Revision of all old renaturalisation-concepts. Construction of a model to the natural succession, on the basis of defined start-conditions. Development and implementation of a care concept, for the preservation of a **maximum of biodiversity**.

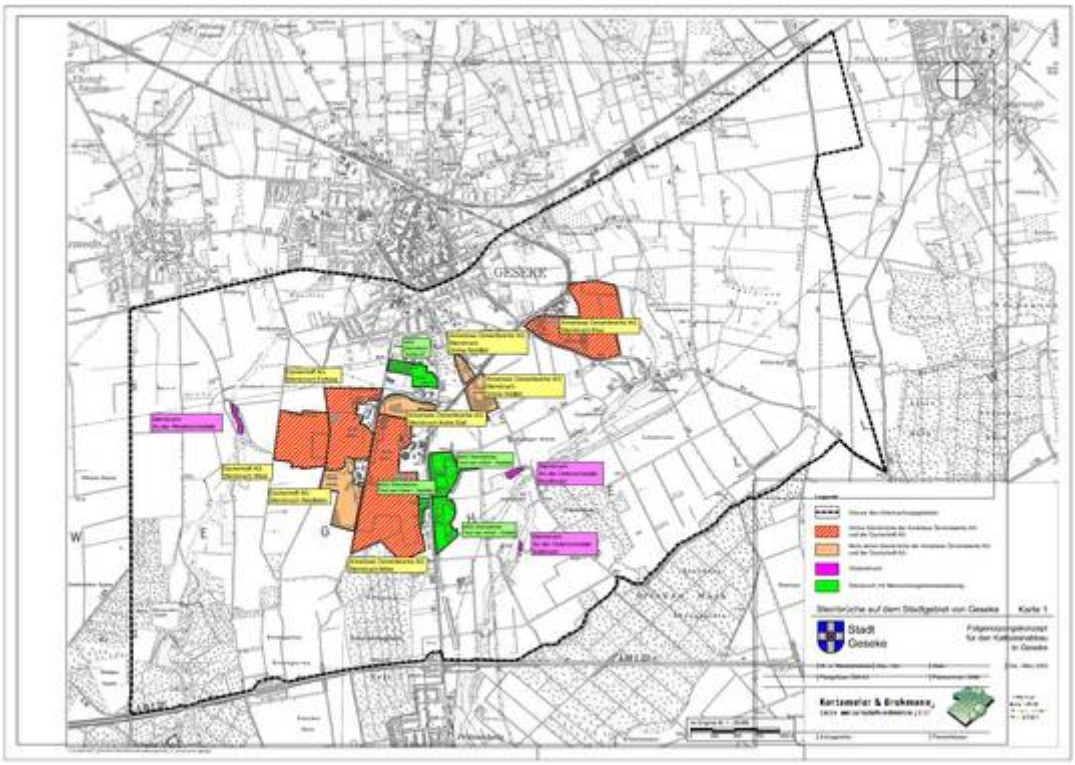



Fig. 2: Location drawing of the excavation area in Geseke (2004) Origin: FNK

5. Use of the considerable stock areas of the excavation-industry for eco-pool measures.
   Result: Execution of an extensive program to the protection of wild field herbs (currently approx. 15 km field margins).
6. Use of compensation areas to the networking of the „natural protection quarries" with natural habitant types of the nearer surroundings, like beech-forest on limestone, lime neglected meadows or dry valleys.
   Result: Establishment of **Foundation for nature conservation Geseke** (2009) for the long term development and care of compensation areas (actually: 16 ha, projected to 2014: 30 ha).

The project „Hellweg-Stonesheep" is an integral element of point 3 and 5.

## Care areas

The „Hellweg-Stonesheep" are currently used in the following areas:

## Quarry „Monopol"

Characteristics: old excavation, terraced on former excavation by hand, a depth of up to 20 m, closed down in 1934. After this, extensive grazing by local shepherds with sheep and goats. After 1980 no more grazing. Total area approx. 7 ha. Larger complexes of gentian-pyramidal-hairgrass-meadow (Gentiano-Koelerietum), partially ruderalized and became covered with bushes and trees. More than 40 red-listed plant species, numerous endangered mosses and lichens. Fauna is not systematically listed. Remarkably is red-backed shrike (Lanius collurio), turtle dove (Streptopelia turtur) or ant-cricket (Myrmecophilus acervorum). Care work has been carried out since 2005 by local nature conservation association "VerBund e.V.".
Grazing since 2009.

Documents:
Betreuungsbericht 1999/2000, VerBund e.V. Geseke, unpublished.
Vegetationskartierung 2009, VerBund e.V. Geseke, unpublished. Annex

Fig. 3+4 : left quarry-bed, right upper plateau in summer 2012, both areas became covered with bushes an trees up to 2009 and had been intensively grazed by the sheep in the last 3 years. Fotos: Manfred Raker

## Halde Lothringen

Slag-heap of former quarry „Lothringen", high up to 20 m, closed down in 1934. After this, extensive grazing by local shepherds with sheep and goats. After 1980 no more grazing. Total area approx. 0,8 ha. Little rests of gentian-pyramidal-hairgrass-meadow (Gentiano-Koelerietum), partially ruderalized and became covered with bushes and trees. More than 20 red-listed plant species, numerous endangered mosses and lichens. Care work has been carried out in 2011 by local nature conservation association "VerBund e.V.".

Grazing since 2012.

Documents:
Betreuungsbericht 1999/2000, VerBund e.V. Geseke, unpublished.
Vegetationskartierung 2009, VerBund e.V. Geseke, unpublished. Annex


Fig. 5+6 Left area in august 2011 covered with bushes an trees and rests of low-nutrient calcareous meadows. Right area in August 2012 after removal of shrubs in winter 2011/12. Fotos: Manfred Raker

## Menken-Steinbruch

Small quarry used for local house building. Excavation started before 1820, a depth of up to 6 m. After this, extensive grazing by local shepherds with sheep and goats. After 1970 no more grazing. Total area approx. 0,2 ha and surrounding grassland approx. 0,4 ha. Care work has been carried out in 2012 by Foundation for nature conservation Geseke as a compensation measure for HeidelbergCement AG.

Grazing since 2012.


Fig.7+8: Menken-Steinbruch in August 2012 after removal of shrubs in winter 2011/12. Fotos: Manfred Raker

## Qualification profile for the sheep

Because of the special location conditions of the care area limestone-quarry and the care aims special demands are placed on the animals:

1. The sheep must be able to move in the very rough area. They must be good climbers.
2. The low-nutrient meadows and particularly the pioneer species on rock-flats are relatively step-sensitive. The sheep should therefore be relatively light.

Fig. 9: Ram, which has chosen a „favourite-place" in a rock of quarry "Monopol".
Foto: Manfred Raker, Sept. 2012

3. The main problem by taking care of low-nutrient-meadows is the preservation of covering with bushes and trees. The animals therefore should efficiently suppress young trees and the stump-shooting of the care-areas.
4. At already stronger fallowed areas usually after the removal of shrubs dry plants of Tor-grass (Brachypodium pinnatum) or Wood small-reed (Calamagrostis epigeios) remain, which conventional sheep do not eat. If the new sheep also ate this stocks, a cost-intensive mowing would not be necessary.
5. Light extensive sheep only have a low carcass weight. Therefore the economical benefits are significantly reduced. The extensive keeping should therefore be connected with a reduction of keeping costs. Concerning the breeding it means a selection on hair sheep, easy lambing or good winter hardiness.
6. These application areas are very confusing – an intensive control of the flock is not practicable. The animals therefore should be relatively shy to avoid problems like theft or additional feeding.

## Methods

According to the experiences of the Nolana-project (see www.nolana-schafe.de) there are three possible ways of achieving the above mentioned breeding aim of back crossing hair sheep (MINHORST 2008):

1. Cross breeding Tyrolean Stone Sheep with Cameroon Sheep and stabilization on the Filial 1 (F1) with subsequent selection of brown and grey types (according to the breeding aim)
2. Cross breeding Tyrolean Stone Sheep with Wiltshire Horn Sheep and stabilization on the F1 with subsequent selection (according to the breeding aim). Selection against white is difficult.
3. Cross breeding German Grey Horned Heath with Wiltshire Horn and stabilization on the F1 with subsequent selection (according to the breeding aim). Selection against white is difficult.

The process of achieving a synthetic breed is carried out according to the following breeding formula:

First of all, the maternal breed is crossed with the paternal breed. What follows is the so called "Inter-se mating" in the F1-generation, i.e. the interbreeding of the F1-generation. Following that is selection based on the desired type.

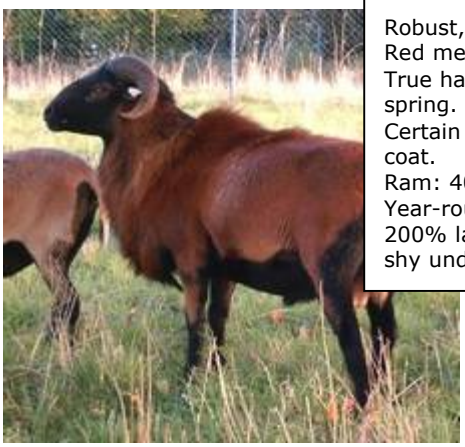
The best option is to develop the cross between Tyrolean Stone Sheep and Cameroon Sheep. (Owing to limited availability of Tyrolean Stone Sheep, the current project made additional recourse to the German Grey Horned Heath.)

The offspring exhibit all phenotypic attributes of primitive domestic sheep:

- Ruddy short hair covering
- Sheds winter coat in spring; no need to shear
- Rams have horns
- Similar weight to landrace sheep
- Good, hard hooves
- Resistance against internal parasites
- High fertility rate and excellent meat quality

Fig. 10: Ewe from the F1 Generation.
Photo: Manfred Raker

The breeds intended for crossbreeding are briefly introduced here:



**Breeding profile of a Cameroon Sheep**

Robust, long living, small landrace sheep
Red meat with gamey taste.
True hair sheep. Naturally sheds winter coat in spring. Requires no shearing.
Certain specimens do not produce a winter coat.
Ram: 40 – 50 kg, Ewe: 30 - 40 kg
Year-round breeders, very fertile,
200% lambing rate a year is possible. Can be shy under extensive management.

**Breeding profile of Tyrolean Stone Sheep**

Very robust, very undemanding landrace sheep with a ruddy fleece.
Ram: 70 - 80 kg, Ewe: 45 - 50 kg
Seasonal breeders, 1 (-2) lambs
Red meat with gamey taste.
Shy under extensive management.

**Breeding profile of the German Grey Horned Heath**

Very robust, very undemanding landrace sheep with a very ruddy fleece.
Ram: 70 - 80 kg, Ewe: 45 – 50 kg
seasonal breeders, 1 (-2) lambs
Red meat with gamey taste
Shy under extensive management.

## Results

The original stock at the start of the project in 2009 consisted of:
- 1 Cameroon Ram
- 3 Tyrolean Stone Sheep ewes
- 6 Grey Horned Heath ewes
- A suitable large pasture with several enclosures (6.5 ha quarry "Monopol")
- Work infrastructure:
  Secure fencing, shelter, feeding and watering facilities, pen and herding facilities and miscellaneous equipment. The means to transport the herd from one area to the next is not yet available.

Fig. 11: Members of the registered association for nature protection, "VerBund e.V.", building a shelter.
Photo: Manfred Raker

- Care and surveillance personnel are supplied by the agricultural branch of "KKLP Grünland & Megafauna GbR" (civil law association).
- Both the registered "Association for Biological Environment Protection in the district of Soest (ABU)" and various breeding enterprises from "Nolana-Sheeps" are available as project partners for the exchange of rams

Three years after the project began the following interim results were achieved:

1. **Fertility/lambing results**
   Until now 8-10 lambs have been born every year, predominantly between the months of March and May. The animals in question have therefore proved to be decidedly seasonal, which corresponds to conditions in the wild and which is advantageous for robust behavior.

2. **Colouring**
   The colour, corresponding to the breeding aim, has not yet been

achieved. To this end, further selection over several years will be necessary.

3. **Development of hair covering**
   The hair covering corresponding to the breeding aim has already been achieved in some sheep but not yet in others. Further selection is also required for this characteristic.

4. **Animal health**
   To date the cross bred animals in particular have proven to be very healthy and not very susceptible to illness. Only the Tyrolean Stone Sheep were susceptible to diarrheal diseases.

5. **Winter hardiness**
   All the sheep have proved to be exceptionally hardy in winter. Even birthing under very wintery weather conditions occurred normally.

6. **Slaughter weight**
   The expected slaughter weight was reached without any problems.

7. **Problems relating to extensive rearing / care of the herd**
   Intermittently there were some individuals who managed to squeeze out under the fence in order to graze outside of the enclosed area. As a result the fence had to be fortified with additional pegs in numerous locations. One particularly stubborn mother, who constantly followed her lamb through the fence, had to be slaughtered.

8. **Costs**
   The accruing costs of animal health, winter feeding, shelter maintenance etc. are largely covered by agricultural subsidies. Personnel costs are not covered.

9. **Natural coppicing**
   The suppressing of young trees and the stump-shooting worked better than expected. In particular the dominant ash (Fraxinus excelsior) and hawthorn (Crataegus spec.) species were so strongly browsed that the roots gradually died away.

Fig. 12: Comparison of grazed areas (on the right) and ungrazed areas in August 2011. Photo: Manfred Raker

10. **Development of turf / species composition**

At the start of grazing, large sections of the area were cultivated with Tor-grass (Brachypodium pinnatum), which created a thick grassy felt with a high dispersion rate. Other subareas were dominated by Wood small-reed (Calamagrostis epigeios). The sheep also efficiently browsed these stocks. Shortly after grazing began, expanses of nettles and Canadian golden-rod (Solidago canadensis) had already been completely destroyed. As a result of grazing a short grassy turf has developed, in which the Tor-grass has receded and the number of other species such as Pyramidal hair-grass (Koeleria pyramidata) has increased.

11. **Browsing on trees**

The sheep eat the remaining leaves on trees and bushes that they are able to reach and consequently the herbaceous vegetation that grows underneath benefits from more light and is able to grow better.

12. **Influence on protected / endangered plant species**

Sheep select the plants they eat according to taste, not according to conservation status. As a consequence there are also some protected species which are eaten and driven back. At the same time however, other protected species are given a chance to develop. On the whole, strong browsing on bitter plants such as Fringed Gentian (Gentianella ciliata) was also identified. The conflict between maximum browsing on trees and protecting endangered species can be resolved through proper pasture management.

Fig. 13: Blossom of the German Gentian (Gentiana germanica) which produced a "dwarf flower" following sheep browsing. In comparison: a 5 cent piece on the right.
Photo: Manfred Raker

## 13. Nitrogen fixation of the area with dung

The sheep dung was not observed to have any negative effects on the area. Only in small areas around the shelter was there an increased growth of nettles and other nitrogen indicators.

## Discussion

At the Geseke work plant there are exploited and abandoned excavations owned exclusively by HeidelbergCement and covering an area of over 50 ha (see appendix), which are planned for long periods for nature conservation and recovery according to the after-use proposal. The area has great significance for the protection of nature and species. Equally for the local population, it represents an attractive recreational space.
Proper maintenance of the area aimed towards preserving and potentially increasing biodiversity is financially very costly. A local nomadic sheep herd comprising of robust landrace sheep, which would constitute the ideal instrument of care, is not an option. Attempts at sheep paddocking in collaboration with a part-time sheep farmer using standard meat sheep such as Black Head or Merino sheep did not produce satisfying results.

The "Hellweg Stone Sheep Project" aimed at breeding a "land nurturing breed" is a successful approach. The development of a large herd coupled with consistent area management allows for continuing improvement of area maintenance and a reduction in maintenance costs.

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**List of appendices:**

Appendix 1: Outline map of the quarries in the urban area of Geseke, as of 2003 (from after-use proposal for limestone mining in Geseke 2004, unpublished).

Appendix 2: Map of biotope types and location of endangered plant species, as of 2009 (from vegetation mapping by "VerBund e.V.", Geseke 2009, unpublished).

Appendix 3: Map of protected biotopes in 2009, in accordance with section 62 of the North Rhine Westphalia Countryside Act (from vegetation mapping by "VerBund e.V.", Geseke 2009, unpublished).

Appendix 4: List of endangered and legally protected plant species in the nature conservation area "Quarries On The Heights" for the year 2009, "VerBund e.V.", Geseke 2009, unpublished.)

Appendix 5: List of mapped moss species in the nature conservation area "Quarries On The Heights" for the year 2009, "VerBund e.V.", Geseke 2009, unpublished.)

Appendix 6: Report: „A new discovery of Myrmecophilus acervorum (PANZER, 1799) on the north west distribution boundary ARTICULATA 2007 22 (1): 99–101