Final project report

Reconquest of aquatic life in the Ménophe

1. Contestant profile

▪ Contestant name:	BRANGEON Anne – BOUCHÉ David
▪ Contestant occupation:	River technicians
▪ University / Organisation	Syndicat Mixte des Vallées du Clain Sud
▪ Number of people in your team:	2

2. Project overview

Title:	Regeneration of aquatic life in the Ménophe
Contest: (Research/Community)	Research – Biodiversity management
Quarry name:	Saint-Maurice-La-Clouère

Abstract

The Ménophe stream passes through the St-Maurice GSM quarry. Quarrying activity has allowed to have a consequent flow in the watercourse throughout the year, it thus presents a major biological interest. The observation of an obstacle to the flow in its middle part was the beginning of a global reflection on this stream. The first step of this project consists in removing this obstacle and thus ensuring ecological continuity (notion of free circulation of fauna and sediments along the linear course of the stream). In parallel of this objective, the creation of a pike spawing area is carried out directly upstream of the first project. The presence of pikes on the Ménophe but the absence of identified breeding area are the elements which justified this development. This realization was possible because the lands adjoining the Ménophe belong to the quarry. Besides the fish interest, this new area allows to diversify the environment on the edge of Ménophe and brings a general gain of biodiversity via this new wetland. The collaboration on this project of three structures with assertive skills has allowed its successful realization: staff of the quarry, the river union and the fishing federation. Communication campaigns were carried out at the different key stages of the project. The evolution and the efficiency of the installations will be followed in order to have a documented feedback on the project.

1) Introduction:

The Ménophe is a temporary watercourse which flows into the Clouère after a journey of a few kilometres, passing through the quarry of St Maurice la Clouère. An intermittent river in the past, the operation of the quarry has turned it into a permanent river for more than 20 years. It thus shelters a dense aquatic fauna. It is of multiple interest for the catchment basin of Clouère from all points of view. Periods of severe low water (low water levels) are becoming more regular in the basin. The constant flow arriving in the Clouère through the Ménophe due to the activity of the quarry is an asset that helps maintain a welcoming environment for biodiversity. Within the framework of a partnership with the GSM quarry, the river association wanted to carry out a global project on this watercourse by starting with the maintenance of the vegetation of the banks of the Ménophe (also called alluvial forest). The discovery of a ruined structure, in its middle part, provided the occasion to reflect more deeply on the ecological continuity from upstream to downstream and the reception potential for piscicultural species (notion of free movement of species and sediments). A project for the restoration and re-establishment of free movement appeared evident to both actors, the quarry moreover being already engaged in a consideration of the biodiversity on its site of operation. A well-defined regulatory framework, simple means and the goodwill of everyone allowed the project to be set up.

1.1) Objectives

The obstacle to the flow, and thus to the continuity of the watercourse, was located underneath a fording and consisted of three old collapsed drainage pipes. This structure artificially raised the water level upstream and blocked some of the sediment, which then accumulated in front of the obstacle and prevented the free movement of fish. The objective was to remove the obstacle, create a biogenic environment and thus restore the continuity and free movement of species, such as the pike, emblematic on the Clouère and threatened according to the Red List of the IUCN France. Removing the structure would provide access to the favourable areas upstream of the watercourse in all periods. Next, the creation of a pike spawning area directly upstream of the adaptation works was studied in order to develop this species, which is well-established on the Ménophe. In fact, adult individuals have been observed several times, particularly at the quarry site. On the other hand, no juveniles have been recorded which indicates the absence of a breeding area nearby. The presence of available land along the watercourse at the quarry site has made it possible to envisage the creation of a spawning ground. Intended for the primary purpose of promoting the reproduction of pike, this area will constitute a new habitat favourable to the installation of a whole procession of wetland species (plants, amphibians, dragonflies, birds etc.)

1.2) Site and target public

Covering an area of 53 ha, the quarry of Saint Maurice La Clouère extracts limestone for the production of aggregates. The dry extraction of the materials leads to the permanent discharge of water into the Ménophe, thereby playing a positive role in the development of biodiversity downstream of the watercourse.

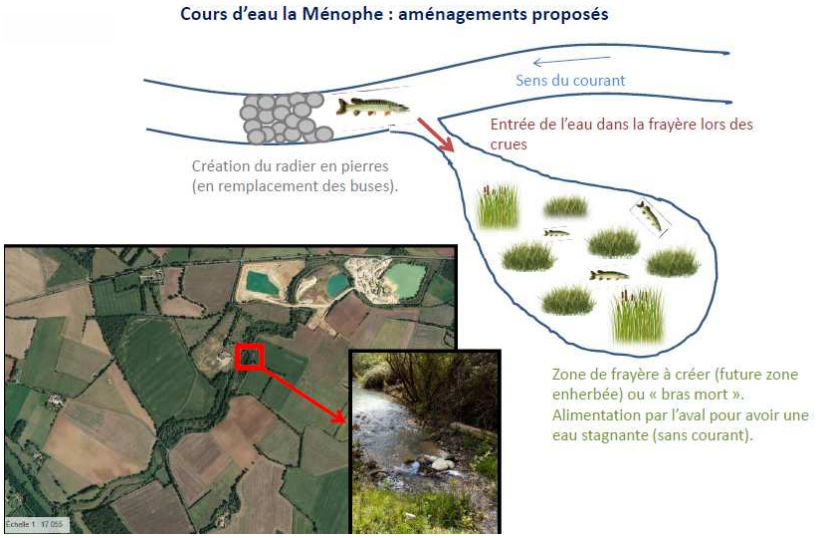
As the general site presents patrimonial and protected species it plays an important role in preserving the territory's biodiversity. Various regulatory studies conducted on the site have highlighted the presence of protected species within different groups: birds, insects, flora. The completed project aims to complement the aquatic biodiversity of the site. This forms part of the general environmental policy of the quarry and is consistent with the national environmental policy, the objective of which is to reinforce the removal of obstacles on watercourses and restore a free flow of species and sediments.

The quarry staff carried out the operational part of the works, thus revealing the full involvement of the quarry. The phases of reflection, preparation and supervision of development were provided by the river association (Public-private association of the Vallées du Clain Sud). The association is the group in charge of maintaining and restoring the aquatic environment in the area. This actor manages the Clouère and its tributaries, among others on its territory. Technical assistance was provided by the Departmental Federation of the Vienne for Fishing and the Protection of the Aquatic Environment (FDPPMA) [Fédération Départementale de la Vienne pour la Pêche et la Protection du Milieu Aquatique], particularly on the project for creating pike spawning grounds.

The following sections of this report will describe the different phases of project implementation, as well as its progress and first results.

2) Actions and activities

The project is structured into two parts, which ultimately constitute a general improvement of the hydromorphological quality and therefore the biological potential of the Ménophe on this section.



2.1) Re-establishment of ecological continuity

Restoration of the ecological continuity on the Ménophe was effected by removing the old structure on the river (collapsed drainage pipes) with the help of a mini-excavator. The alluvial mattress was then reconstituted by creating a stone (base slab) area in place of the structure, over a linear of about ten metres. These adaptation works allow the passage of fish in any period and the creation of a new lotic habitat (running water, as opposed to stagnant water). This new environment is favourable to the development of a variety of benthic invertebrate fauna, in particular rheophilic (having a preference for flowing environments). The adaptation works also make it possible to maintain the historical presence of an anthropogenic crossing point (ford).

The technical partner is principally the GSM quarry; the quarry manager was personally involved in the operation of the work site machine (two working days). The quarry also provided the materials (limestones). The preparation of the adaptation works and supervision was provided by the river association. The completion of the adaptation works followed the schedule presented below:

Ecological continuity		
Actions	**Status**	**Date**
Preparation of the work site	Validated	May/June-18
Dismantlement of the old structure	Validated	June-18
Installation of the stone base slab	Validated	June-18
Monitoring of the evolution	In progress	

Re-establishment of ecological continuity	**YES**

The adaptation works are currently complete and a monitoring of its evolution over time is underway. Two months after its introduction, invertebrate samples were taken to determine which taxa had already colonised this new habitat. Their analysis is in progress but already shows the important presence of taxa subservient to lotic environments (running water).

The photos below compare the general situation before and after the adaptation works.

2.2) Creation of the pike spawning area

The creation of the pike spawning area is located on the left bank of the Clouère, directly upstream of the first adapted area, over about 200 m². The first step was to select the site of the adaptation works. A first site meeting bringing together the association, the fishing federation and the quarry manager took place in winter. In fact, the adaptation works had to be carried out on an area that is already regularly submerged during high-water periods and it was necessary to perform the surveys during this period. Once the favourable location had been identified, a felling of the present trees was carried out to clear the site and provide all the luminosity necessary for the proper functioning of the future spawning grounds. The next step was to take laser measurements to determine the topography of the site and then to determine the shape and depth of the future spawning area. The perimeter of the different areas was defined by stakes to facilitate the future excavation. The major step consisted in carrying out the gradual excavation by mechanical digger to promote the flooding of the area. In fact, a functional pike spawning area must consist of a flooded area of a fairly large surface area, easily accessible by spawners and possess a stable and sustainable submersion during reproduction (0.2 to 1 m of water for about 40 to 60 days from mid-February). It must allow the incubation and growth of alevin and their escape. The area should remain wet the rest of the year to promote the development of a short and dense plant substrate such as grasses, favourable to egg laying. In order to limit the high flows in the spawning grounds that can sweep away the egg layings, the water inlet is downstream of the spawning grounds. Adaptation works were made to the entrance to facilitate

the installation of boards. These will be able to stabilise the water level in the spawning area during the breeding season if this same falls too quickly. To finalise the operation after the excavation, a seedbed was set up to promote the rapid re-vegetation of the site.

The technical partner on this operation is the Departmental Federation of the Vienna for Fishing and the Protection of the Aquatic Environment (FDPPMA). It has extensive experience in spawning grounds and a very good knowledge of pike biology. The rental of the worksite machine and driving of the same were again ensured by the quarry manager (one working day). All stages of preparation and completion were supervised by the river association.

The completion of the adaptation works followed the schedule presented below:

Pike spawning		
Actions	**Status**	**Date**
Selection and validation of the area	Validated	Jan-18
Tree felling on the area	Validated	Feb-18
Staking of the different areas	Validated	Mar-18
Excavation of the spawning grounds	Validated	Sep-18
Monitoring of the vegetation of the area	To come	Oct/Nov-18
Monitoring of the natural impoundment	To come	Jan-19?
Monitoring of the spawning on the area	To come	Feb/Mar-19/20?

Realisation of the pike life cycle	**to be continued**

The adaptation works are currently complete and a monitoring of its evolution over time is underway. First of all, this will consist in monitoring its re-vegetation during the autumn. Special attention will be paid to the potential development of invasive alien species on this exposed area. However, the absence (as far as we are aware) of such species on the area limits their installation. It will then be followed by the monitoring of the impoundment of the spawning ground and, conditions permitting, the spawning. Visual monitoring is planned by the fishing federation and the association. If this monitoring reveals nothing, an electric fishing can be envisaged to obtain a precise knowledge of the situation. Reflection is underway on the classification of the spawning grounds to ensure its sustainability (fishing reserve).

The photos below compare the general situation before and after the adaptation works.

Evolution of the spawning site: initial state, phases of work and final state (before re-vegetation)

2.3) Partnership and communication

The project is structured around three main actors:

- The GSM quarry of St-Maurice-la-Clouère, which owns the land on which the adaptation works are carried out and which ensures the execution of the works and the supply of the equipment,
- The river association, which ensures the preparation, supervision and monitoring of the adaptation works,
- The fishing federation, which provides technical support, particularly on the creation of the pike spawning grounds.

In addition, the elected officials of the territory have been strongly involved in the process. The Mayor of Saint-Maurice-La-Clouère strongly supports the project, participates in various meetings, field trips and acts as a facilitator (provision of the meeting room of the town hall). A field trip was organised at the beginning of the project for the elected representatives of the territory, in the presence of the cantonal deputy in particular, to explain the technical aspects and ecological objectives. During the various stages of the project, articles were published in the local press to inform and raise awareness among the general public on this topic. An article also appeared in the Gazette of the commune of St-Maurice-La-Clouère. Quarry staff were invited to the site for a presentation of current developments and the objectives of the same with respect to biodiversity and the aquatic environment. New visits to the site will be scheduled for the various audiences once the spawning grounds are functional. In addition, a 1st year (16-year-old) high school student is doing a work

experience in the association in this subject as part of their BTA [Brevet de technicien agricole] (Agricultural training certificate) "Management of natural environments and fauna" [Gestion des milieux naturels et de la faunes]. Information signs explaining the operations and their objectives have been installed on site. The Quarry Life Award blog is regularly updated and reviews of the developments will be made on the websites of the association and the fishing federation.

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Deux projets pour préserver un ruisseau

Une réunion s'est tenue à Saint-Maurice-la-Clouère afin d'évaluer les contours d'un partenariat entre un acteur privé et des structures en charge de la préservation de l'environnement. La Ménophe, petit affluent de la Clouère qui avait subi naguère les outrages d'une activité économique débridée et, par ailleurs, les désordres d'aménagements fonciers fantaisistes, a fait l'objet de toutes les attentions.

Anne Brangeon, technicienne au Syndicat mixte des vallées du Clain-sud (SMVC) s'est livrée à une présentation détaillée des opérations en cours (1) puis a fait part des deux projets concomitants concernant ce même cours d'eau: la participation à un concours de dimension nationale et internationale, le Quality Life Awards et la « renaturation » du site de l'étang du Pin: des actions concrètes d'aménagement et de préservation de la biodiversité. *« L'exploitation d'une carrière est une parenthèse dans la vie d'un territoire. Les espaces se prêtent à des usages multiples mais il nous faut avoir désormais une approche vertueuse des activités économiques, préserver les fonctionnalités de l'espace »* a indiqué en substance Camille De Paul, responsable « Environnement » de la carrière GSM, filiale du groupe Heidelberg.

Anne Brangeon s'est livrée à une présentation détaillée des travaux.
LIEGE JACKIE

Articles available on the Quarry Life Award website

saint-maurice-la-clouère

Un concours de biodiversité

La barre a été placée haut, très haut même puisque, comme nous l'avions précédemment noté dans nos colonnes (lire notre édition du 6 avril), le SMVC (Syndicat mixte des Vallées du Clain sud) s'est positionné sur le Quarry Life Award, un concours d'envergure nationale voire internationale. Il aura fallu toute la ténacité d'Anne Brangeon, technicienne, pour présenter devant Stéphane Rivière, membre du jury, le projet – mené conjointement avec les acteurs de la carrière de granulats GSM – de création d'une frayère à brochets parallèlement à la Ménophe, petit affluent de la Clouère. Camille de Paul et Bruno Beaubrin étaient venus en appui pour soutenir ce dossier « en béton ». Et le responsable du site s'est largement exprimé sur le sujet : *«Nous allons capitaliser sur des initiatives locales ; les personnels ont intégré les enjeux dans le contexte d'une évolution sociétale et réglementaire »*. Mais rien n'est gagné à ce jour, face aux 5 autres concurrents du territoire français, lesquels doivent aussi rivaliser avec des projets initiés jusqu'en Afrique. Michel Pain, le maire, s'est félicité de ce challenge également soutenu par la municipalité et a salué l'opportunité pour le jeune Raphaël Multeau d'effectuer, dans ce cadre, un stage comptant pour son cursus du bac pro environnement. David Bouché, technicien également au SMVC, a apporté des précisions notamment sur l'aspect botanique de l'intervention. Les résultats de ce concours, d'une somme pouvant s'élever à 30 000 €, seront connus courant novembre.

Valérie Cauchi, responsable nationale du département Environnement du groupe Heidelberg (secteur granulats) a présenté les enjeux du concours.

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Les petits ruisseaux font les grandes... frayères

Le syndicat mixte des vallées du Clain sud (SMVCS) accorde depuis quelques années une attention particulière à la Ménophe, petit affluent de la Clouère. Le point de départ de cette démarche a été la rencontre entre les acteurs du SMVC et les gérants de la carrière GSM, située sur le territoire communal.
Le constat commun a en été le manque d'entretien et la dégradation des habitats aquatiques dans ce cours d'eau, de manière générale. Par convention, le syndicat a entretenu la végétation des rives et retiré les embâcles, en prenant soin de laisser toutefois des branches le long des berges pour conserver des abris pour les poissons. En contrepartie, l'entreprise a cédé à différentes reprises des matériaux pour la réalisation de travaux de restauration du lit de la Clouère.
Suite à ce partenariat, le responsable de la carrière a proposé au syndicat de participer au Quarry Life Award, un concours à échelle nationale et internationale, pour valoriser un projet environnemental à proximité d'un site d'exploitation. Il s'agira en l'occurrence, de retirer un obstacle à la continuité écologique (buses effondrées) et la création d'une frayère à brochets sur les parcelles mêmes de la carrière. Cette espèce a été observée depuis des décennies dans ce cours d'eau.
La Fédération de pêche de la Vienne est partie prenante du projet pour ce qui est de l'aspect technique. Tout au long de l'année, le syndicat communiquera sur son avancement au travers d'un blog à destination du jury du concours mais également du public et des partenaires.
« Une visite sur le terrain est envisagée pour associer le conseil municipal à cette initiative » a indiqué Anne Brangeon, technicienne au SMVC.
Ce projet s'inscrit dans une démarche globale d'amélioration du fonctionnement des cours d'eau relayée par le CREN Poitou-Charentes lequel va, à ce sujet, proposer aux propriétaires concernés de refaire passer la Ménophe dans son lit d'origine. Le ruisseau avait jadis été dévié juste avant de rejoindre la Clouère laissant place alors à la création anarchique du plan d'eau du Pin.
Blog: www.quarrylifeaward.com/

Les rives de la Ménophe ont été libérées des embâcles.
LIEGE JACKIE

3) Discussion

3.1) Achievements and impediments of the works

Due to the experience of the river association in the development of watercourse restoration (more than 15 works of adaptation already carried out on the territory) and of the federation of fishing in the creation of spawning grounds pike, the expected theoretical results are known. The experiences of the various actors have been highlighted to optimise the project. The implementation of the works has respected the technical aspects identified beforehand; the adaptation works in line with the initial expectations. However, achievements are dependent on natural conditions, including hydrology, which can vary significantly from one year to another. In particular, it will be several years before the efficiency of the spawning grounds will be able to be judged. Depending on the observations, consideration will be given to re-intervene if necessary. Spawning maintenance is regularly carried out by the association officials, mainly through brush clearing operations (the absence of shrubs and the presence of light in the spawning ground are necessary conditions for its proper functioning).
The adaptation works are fully replicable. Several technical documents as well as feedbacks exist on these topics. The results of these adaptation works will complete the knowledge on this type of operation.
The partnership between the three actors involved in the adaptation works is a success, each having been able to bring its particular skills for the smooth running of the operations.

The completion of the adaptation work went smoothly. At the stone base slab, the observation of fish (minnows) in the development at the end of the intervention shows the rapid capacity of the species for re-

appropriation. In addition, the project is coherent with a project for the removal of a stretch of water downstream of the site. This particular project is carried out by CREN [Conservatoire Régional d'Espace Naturel] (Regional Conservatory of Natural Space) of Poitou-Charentes with which the association is in regular contact.

The impediments encountered are few in number and mainly concern conditions related to meteorology and the natural environment. A rise in water on the day originally planned for the start of the work required a postponement of 24 hours in order to achieve the development in optimal conditions. Concerning the spawning grounds, as mentioned above, the evaluation of the effectiveness of the development will depend on the natural conditions (water levels, appropriation of the area for spawning, etc.).

3.2) Added values of the adaptation works

Added value for biodiversity:

The removal of the obstacle and the laying of the base slab improve the free movement of fish and sediment. This adaptation works contribute to the good condition of watercourses as referred to in the European Water Framework Directive (WFD). This reopening of the river will be beneficial to all the species present in the Ménophe. In addition, it leads to diversification and a gain in habitat that will also be favourable to the development of a set of taxa in aquatic environments.

The creation of the spawning grounds will promote the development of the pike, which is a good indicator of the functionality of the watercourses and surrounding areas, particularly the wetlands. These areas are fragile and were heavily modified in the 1970s because the objectives were very different from those of today. Citizens, communities and some businesses have realised the importance of preserving these environments. The recreation of this type of environment bordering the Ménophe constitutes an additional degree of involvement. This area will also favour the development of processions of species associated with the wetlands: amphibians, dragonflies, birds, plants. Different populations will find their place depending on the equilibrium of the environment after several years of evolution and re-impoundment. With a storage area, these adaptation works will also provide services that regulate the watercourse naturally.

The overall adaptation works provide an improvement in the habitat capacity of the environment that can accommodate various populations and promote the development of a protected species, which is the pike.

Contribution for the quarry and the river union:

For GSM, this project is the demonstration of the compatibility of a quarry and the preservation of the natural environment, particularly the aquatic environment in this case. In fact, the quarry is in direct connection with this watercourse as the latter crosses the site of operation. This project is also proof of GSM's consideration

of local issues and cooperation with local actors. The image of the activity is thus valued by communities and residents.

For the river union, this project means an extension of its actions to new areas of intervention, until now difficult to access. It is also an example for developing successful actions with the private sector, where the activity of the association is restricted. This project also has a particular educational aspect due to the work of a work experience student on this same.

4) Conclusion

Two additional developments were realizes on the Ménophe stream within the quarry site. Their goal is to restore ecological continuity then at the same time increase and diversify their biological reception capacities. The realization of these developments was carried out by three organizations in close relationship and was thus able to be done in good conditions of preparation and implementation. The final achievements correspond to the initial expectations. From now on, the free circulation of species from downstream to upstream of the river is restored. The creation of diversified environments (stone area, spawning) will allow an earnings of diversity and will promote, among other things, the development of pike, an emblematic and endangered species. In addition to the ecological interest of the project, it will have also allowed important communication on aquatic environments. The involvement of the elected representatives of the territory was strong, field visits were organized and several articles appeared in the local press to follow developments. The involvement of several types of structure on this project (private, public and associative) shows that it is possible to carry out concerted actions in favour of the environment, particularly on quarry sites.

To be kept and filled in at the end of your report

Project tags (select all appropriate):

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

Project focus:

- ☐Beyond quarry borders
- ☒Biodiversity management
- ☐Cooperation programmes
- ☐Connecting with local communities
- ☐Education and Raising awareness
- ☐Invasive species
- ☐Landscape management
- ☐Pollination
- ☒Rehabilitation & habitat research
- ☐Scientific research
- ☐Soil management
- ☐Species research
- ☐Student class project
- ☐Urban ecology
- ☐Water management

Flora:

- ☐Trees & shrubs
- ☐Ferns
- ☐Flowering plants
- ☐Fungi
- ☐Mosses and liverworts

Fauna:

- ☒Amphibians
- ☐Birds
- ☐Insects
- ☒Fish
- ☐Mammals
- ☐Reptiles
- ☐Other invertebrates
- ☐Other insects
- ☐Other species

Habitat:

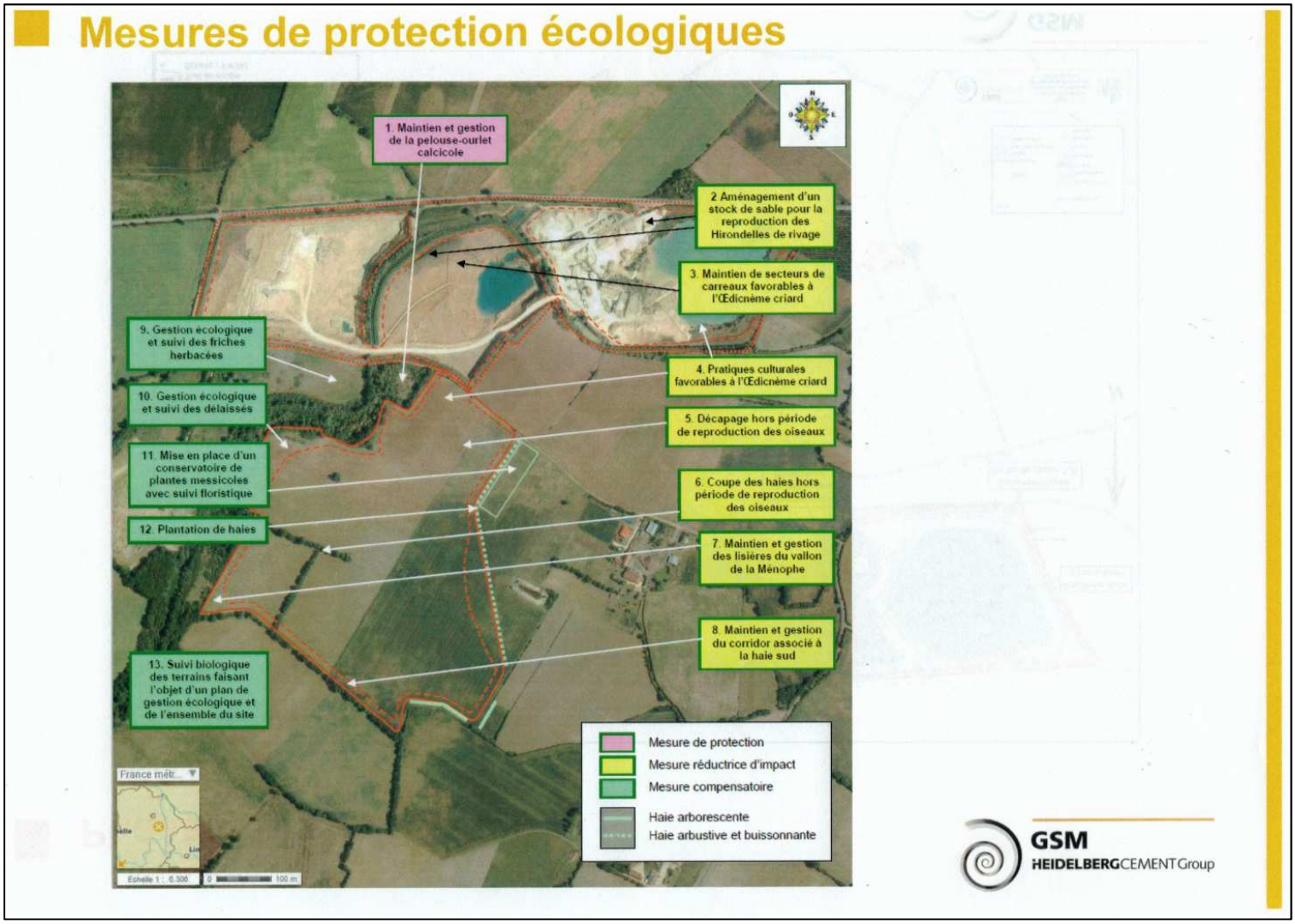
- ☐Artificial / cultivated land
- ☐Cave
- ☐Coastal
- ☐Grassland
- ☐Human settlement
- ☐Open areas of rocky grounds
- ☐Recreational areas
- ☐Sandy and rocky habitat
- ☐Screes
- ☐Shrub & groves
- ☐Soil
- ☐Wander biotopes
- ☒Water bodies (flowing, standing)
- ☒Wetland
- ☐Woodland

Stakeholders:

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

ANNEXES

Site of the adaptation works, aerial photo and hydrographic network on the area



Ecological protections measures taken into account as part of the authorisation for operational renewal of the site