REGULAR ECO-MONITORING OF NEWLY OPENED SANDPITS – REQUIRED BY NATURE PROTECTION AND WELCOMED BY NATURE

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Abstract
The article presents the results of the case study which has been conducted in the area of the newly opened sandpit Spytihněv, lokalita Jih, operated by Cemex, a.s. The study has been focused on regular eco-monitoring of defined animal species and their sites with the basic aim of their protection and un-influencing by the sand mining respectively. The eco-monitoring was primarily required by the territorial nature protection authority and conditioned the opening of the sandpit and one of its aims is the potential future recreational purpose of the locality too. On the site of the miner, the eco-monitoring was understood as a tool potentially supporting nature by the sandpit in general. There are a methodology and the results obtained from the first year of monitoring presented within the article. Even though at the time of sandpit opening, there had been no reference to the appearance of target species directly at the locality, in connection with some specific mining works some of them began to be observed at the locality.

Key words: Eco-monitoring, Sandpits, Spytihněv, lokalita Jih

Introduction

The case study presented in the following article combines aspects of nature protection in the newly opened sand pit in combination with future recreational (educational) land use. The purpose of reclamation of the area after its extraction is to create aquatic ecosystems and ecosystems connected to it, which will be inhabited, if possible, by original plant communities and animal species. The site will then be used as a recreational and educational in order to show the public the possibilities of a positive impact of gravel mining on the landscape. To this end, the miner's cooperation with the nature conservation authority is necessary, as is systematic e-monitoring, so that in the event of a threat to the target species or their habitats, it is possible to react immediately to this fact. Eco-monitoring is then carried out by an independent university workplace after the target species have been defined by a nature conservation authority, the setting of mining work has been defined by the miner and the method of subsequent use of the excavated area has been defined by both above in cooperation with local stakeholders. Aspects of the sustainability of land management (e.g. Brus et al. 2020) and landscape aesthetics were also taken into account (Deutscher 2014).

Material and methods

The location of the case study is the newly opened mining area Jih II Štěrkovna Spytihněv and its immediate surroundings, which gave the presumption of influencing the consequences of opening a new deposit. The boundaries of the locality were chosen to form a logical whole and the locality was bounded by significant dominants, which may form, for example, migration barriers, landmarks, etc. for the monitored species.

The locality is located between the villages of Topolná and Napajedla in the cadastral area of Napajedla and near the cadastral area Spytihněv and Topolná. The area for eco-monitoring has an area of about 45 ha and outside the own mining area it is arable land. Its northern border is formed by the access road from the village of Topolná and Napajedla. The eastern border is formed by a draw, which separates the field from the Burava stream. The southern border copies the field with the adjacent fallow deer park and RKS Topolná. The western border is formed by a road, which is bordered to about half of it by a shrubbery, which then ends and the road leads to the already mentioned road and separates the monitored area from the neighboring field. The whole area has logical and well-defined boundaries in the field (see fig 1).

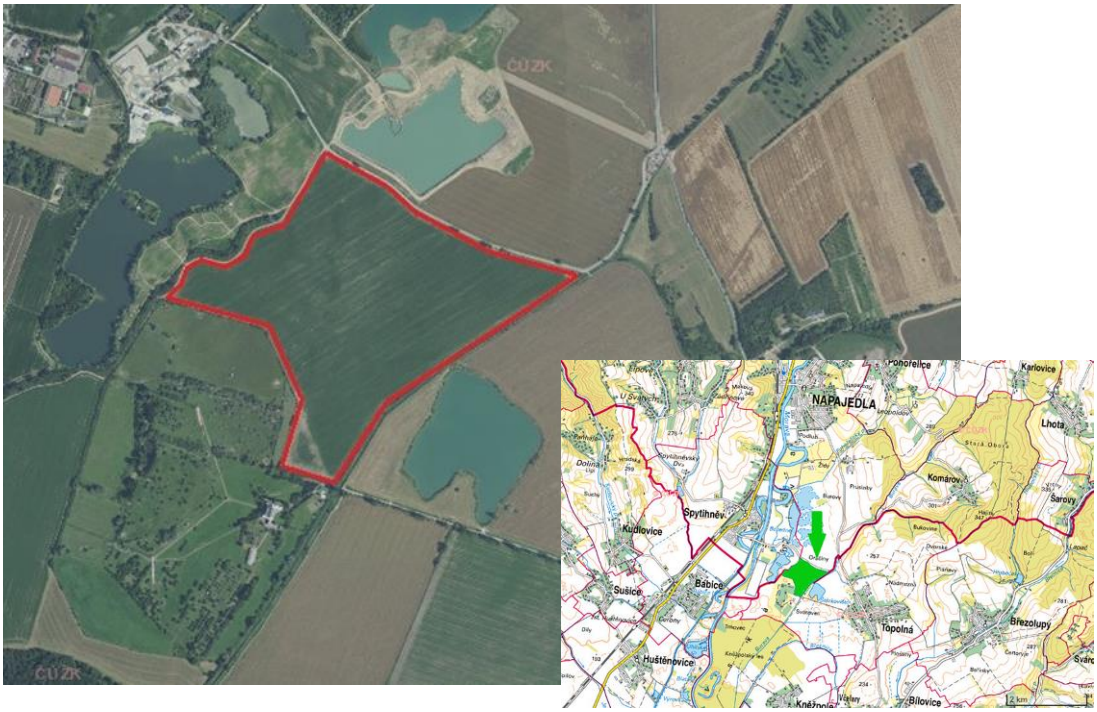

Fig. 1: Borders of the locality and its location

The following target species were selected by the nature conservation authority for eco-monitoring (their bionomy was taken from Bejček 2009, Pavelka 2000, Pokorný 2002 and Řehák 2011):

- Bumblebee (*Bombus sp.*) - Specially protected species according to Decree No. 395/1992 Coll. in protection category - endangered.
- *Oxythyrea funesta* - Specially protected species according to Decree No. 395/1992 Coll. in protection category - endangered.
- *Pelophylax ridibundus* - Specially protected species according to Decree No. 395/1992 Coll. in protection category - critically endangered.
- Field Quail (*Coturnix coturnix*) - Specially protected species according to Decree No. 395/1992 Coll. in the protection category - highly endangered.
- Moth (*Circus pygargus*) - Specially protected species according to Decree No. 395/1992 Coll. in the protection category - highly endangered.

Eco-monitoring took place systematically in the period from April to September 2021. The systematic eco-supervision was preceded by a tour of the site with a representative of the contracting authority in March 2021 and ended with a final tour at the turn of October and November.
Systematic eco-surveillance took place through day trips around the site on a monthly frequency. All potential occurrences of selected species such as borders, road edges, draws, water areas, and wetlands were monitored. Furthermore, the places inside the solved area (field) were monitored, where the occurrence of the nest of both floodplain and quail, or even the bumblebee, would be possible. In particular, residence signs and sound expressions were sought. In the case of the *Oxythyrea funesta*, it was crucial to thoroughly inspect all the flowering plants on which it occurs most frequently. The Common Frog was searched exclusively for wet habitats, in the vicinity of mining and emerging water areas, and in pools in rutted tracks. All findings were recorded in a field notebook, in which data related to the occurrence of the monitored species were recorded, i.e., date, time, outdoor temperature, weather, and the occurrence of all animals, resp. there in the case of monitored and their manifestations. During each visit to the site, photographs were taken of the growing mined water area and its surroundings.

Results

The results of the case study are as follow:
1. Records from regular monthly appointments (an example is given below)
2. Overall assessment of the situation and proposal of measures for a) solution of possible conflict situations and b) for strengthening the potential of occurrence of target species so that these localities will soon occupy and thus fulfill the goal of future recreational-educational use of the locality

Example of minutes from regular monthly appointments:
Eco-monitoring 30.8.2021

- 14 ° C, overcast
- Mined water surface noticeable of larger dimensions
- Animals moving in the monitored area:
- honeybee, cabbage white butterfly, green frog (see fig. 2), magpie, hare
- Grain (sown wheat) already cut, rotating hops bear fruit
- On the eastern border of the monitored area, next to the field road, the occurrence of the green jumper in puddles on ruts
- Occurrence of solved species: NO

Fig. 2: Green frog (*Pelophylax esculentus*), 30.8.2022

Overall assessment of the situation and proposal of measures
Bumblebee (*Bombus sp*.) - The nests of the species were not confirmed in the solved area and only individuals were seen in the spring and summer, when they flew on the flowers of plants around the road edge, draw and at the edge of the field in the bush. Bumblebees used the area only as a food habitat.
Oxythyrea funesta - This species of goldfinch was not seen in the area.
Pelophylax ridibundus - Its occurrence has not yet been confirmed on the created mined area. One individual Green Frog (*Pelophylax esculentus*) was found in observation 30.8.
Field Quail (*Coturnix coturnix*) - No occurrence of this species was recorded in the monitored area.
Circus pygargus - No nesting or residence of this species was recorded in the monitored area.

Discussion and conclusion
According to the results for the entire monitored period, the course of mining and its impact on the surrounding habitats can be stated as minimal for selected endangered animal species. The permanent occurrence of the bumblebee (*Bombus sp*.) and *Pelophylax ridibundus* has not been confirmed in the selected area and the mining has not disturbed their natural environment for the movement, reproduction, or food. The presence of the bumblebee (*Bombus sp*.) in the locality was only to ensure food, but no signs of residence were seen. The occurrence of *Oxythyrea funesta, Coturnix coturnix* and *Circus pygargus* has not been recorded both permanently and intermittently.
The occurrence of other animals in the studied area is also small. There are quite common species, in minimum or expected numbers (roe deer, hare).

Recommended measures for minimizing the impacts of mining opening on the occurring animals and strengthening the possibility of their occurrence at the site so that the goals of potential recreational and educational use of the site are met:

- use exclusively defined routes and existing routes to move equipment

- do not disturb resting and feeding places for animals - borders, road edges, draws, ditches, shrubs, trees
- in case of finding any of the mentioned protected species - immediately ensure their protection against the adverse effects of mining (marking of nests, calm during the nesting period, etc.)
- prevent the release of oil substances and other chemicals into the environment (habitat)
- after the completion of harvesting - planting of trees near the water surface in accordance with the reclamation plan

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Souhrn

Článek prezentuje výsledky případové studie, která byla provedena v areálu nově otevřené pískovny Spytihněv, lokalita Jih, provozované společností Cemex, as. Studie byla zaměřena na pravidelný ekomonitoring definovaných druhů živočichů a jejich lokalit se základním cílem jejich ochrany a minimalizací jejich ovlivnění těžbou štěrkopísku. Ekomonitoring byl primárně požadován územním orgánem ochrany přírody a podmínil zprovoznění pískovny a jedním z jeho cílů je i potenciální budoucí rekreační účel lokality. Účel budoucího využití lokality totiž má být rekreačně-edukativní v tom smyslu, že lokalita má ukázat možný pozitivní vliv těžby štěrkopísků v území (mimo obecné negativní dopady). Na místě těžaře byl ekomonitoring chápán zejména jako nástroj potenciálně podporující přírodu u pískovny obecně. V článku je uvedena metodika a výsledky získané z prvního roku monitorování. Výsledky získané v tomto období ukazují, že těžba štěrkopísku na lokalitě výrazně neovlivňuje výskyt cílových druhů, ale na druhou stranu v prvním roce realizace těžby ani výrazně nevytváří podmínky pro jejich výskyt. Studie tedy předkládá návrhy opatření, která by mohla vést k podpoře výskytu cílových druhů, a tak k naplnění budoucího účelu využití lokality – ochrany přírody a edukace.

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