LANDSCAPE CHARACTER AND INTEGRATION OF MINING LAKES INTO THE LANDSCAPE - OPPORTUNITIES AND RISKS

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https://doi.org/10.11118/978-80-7509-904-4-0140

Abstract
This paper looks at the revitalisation of large mining lakes and their effective integration into the landscape. It also gives concrete examples of how lakes can be used for landscape restoration, the creation of valuable habitates, environmental education or recreation.

Key words: Landscape protection and creation, conflicts of interest

Introduction
Mineral resources play a key role in the industrial development of society. Extracted space is not only a necessary evil but also a great opportunity to enrich the landscape and develop its natural, socio-economic and cultural functions

Materials and methods
Large-scale extraction of raw materials takes place mainly on agricultural land and, to a lesser extent, on land intended for forestry. Reclamation of areas affected by mining is governed by Act No. 44/1988 Coll., on the Protection and Use of Mineral Resources (Mining Act), Act No. 334/1992 Coll. on the protection of the agricultural soil fund, and by Decree No. 271/2019 Coll. on the determination of procedures to ensure the protection of the agricultural soil fund. Reclamation of land intended for the performance of forest functions is governed by Act No. 289/1995 Coll., the Forest Act.
During last twenty years, the principles of natural restauration been increasingly used (Jongepierová, 2018), which have also been applied in presented sites.

Results
A reclamation project is always based on three pillars: extraction of the raw material - protection of existing values of the area – target use of the area. A well-designed reclamation plan takes advantage of the existing and potential values of the site, respects the memory of the landscape and coordinates potential conflicts of interest. Various interests meet here - water source, recreation, fish farming, water sports, local entrepreneurs, municipalities etc. Often nature conservationists - ornithologists, herpetologists, entomologists, botanists, etc. have very different or even contradictory requirements. Finding a compromise is thus the most challenging part of the work.
In my contribution, I would like to introduce you to two different sites - Spytihněv Gravel Pit and Náklo Sand Plant. I've been working on for a long time.

Gravel pit Spytihnev
The area of interest is situated in the Zlín Region, in a wide floodplain of the Morava River, south of the town Napajedla. The entire mining area lies within the Morava River Quaternary Protected Area, along which the supra-regional biocorridor of the TSES (Teritorial system of ecological stability) is routed. Before mining began, it was an intensively used agricultural landscape. A thorough mapping of the landscape preceded the start of mining in the 1990s. Subsequently, a reclamation plan was drawn up in the form of ongoing revitalisation with the aim of approximating the character of the original floodplain landscape and creating a framework for the trans-regional and local TSES.

Fig. 1: Spytihněv – total view

The reclamation plan was gradually developed into partial stages and gradually implemented over the years. The result of the reclamation is the creation of a nature-like floodplain landscape, in which the water and wetland areas of the floodplain forest segment, landscape greenery and especially differentiated grasslands alternate from the original high-stemmed meadows, through productive mesophilic areas to dry grasslands on a sandy substrate. The scale of the restored landscape is harmonious with the restored historic landscape structures (rounded water bodies with accompanying greenery, fruit plantations in the historic footprint, mosaic of meadows). The revitalised areas currently represent a segment of the restored valley floodplain and the overall space has a significantly higher ecological and aesthetic value than the original agrocenoses. The restored landscape also has a higher retention capacity, which was evident in the 2006 floods.
The target use of the site is also part of the plan, including transport accessibility (future use as part of marked hiking trails, horse and cycle paths, connection to the Bata Canal).
In the more remote part of the site, quiet areas without access are purposefully created.

Náklo sand mine

The Náklo sand mine is located in the Olomouc Region in the Morava River floodplain between the towns of Olomouc and Litovel. The mine is immediately adjacent to the Litovelské Pomoraví Protected Landscape Area. Intensive mining has been taking place here since 1945. Mining is large-scale , the mining edges are sharp, the shapes of the lakes are straight and geometric.
This is a very rich deposit. It is currently being mined from the bottom and gradually expanded slightly. The proportion of backfilled areas are limited and there are used as agricultural land again (after reclamation). The revitalisation therefore aims at restoring soil fertility to the exploited areas and promoting biodiversity. To this end, a Biodiversity Action Plan was developed by experts in 2016, focusing on the conservation of umbrella species. The recommendations were then incorporated into the Remediation and Reclamation Plan and is continuously updated and implemented.
The reclamation plan also includes the integration of the mining site into the landscape.
Mining takes place in a large-scale agricultural landscape, in an open landscape setting and close to settlements. To protect them, noise barriers with planting of greenery and other linear plantings have been implemented, completing the rough mosaic of the landscape. The alley planting of oaks and a group of different willows , there are in the area between the mining and the Litovelské Pomoraví Protected Landscape Area . All planting show good.
The mining lakes are a typical conflict site - in addition to nature conservation, fishermen, yachtsmen, holidaymakers and others who have colonised the shores and built up their facilities over the years are making a significant impact. Due to the proximity to the regional city, the situation has become difficult to sustain in recent years - the banks of the areas where mining has ceased are occupied by crowds of people enjoying the sun and water in the summer months. Hundreds of cars block roads, dirt tracks

and related areas. Local citizens are then forced to endure noise, heavy traffic and other negative impacts of recreation... This is a situation the mining company is seeking to address in cooperation with the municipalities. However, this is a very difficult task that requires the cooperation of the miners, landowners, the affected municipalities, the police and other government authorities.

Fig. 2: Náklo – overall view

Discussion

Adverse impacts on the landscape and the environment are most significant and unnoticeable, especially during the mining period, as they are manifested by direct disturbance and changes to the landscape and its components. A well-developed and phased reclamation plan can minimize these negative impacts, in no small part already during mining.

It proves necessary to monitor and refine the reclamation plan according to the actual development of the site. It is also very important to determine the reclamation objective and the possibilities of subsequent use of the site for the termination of mining. Many problems can be avoided by informing the public and cooperating with the municipalities and public authorities concerned

Conclusion

The practice shows increasing demands on the quality of the reclamation process from the reclamation plan, through the reclamation plan to the implementation project.

The exploited areas have great potential - not just the usual water management, recreational, sporting or fishing uses. New legislation (Decree No. 271/2019 Coll.) already allows for the allocation of part of the mining area for valuable habitats and protected species. However, there is also great scope for finding a new balance in the landscape. Targeted measures can make a significant contribution to adapting the landscape to climate change. Suitable areas can be found for the location of renewable energy sources. For successful implementation of the plans, it is essential that they are reflected in spatial planning documents.

References

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Souhrn

Příspěvek se zabývá potenciálem a využitím těžebních jezer, jejich zapojením do krajiny a možnostmi následného využití. Na příkladu dvou rozdílných lokalit je ukázána potřebnost zpracování rekultivačních plánů, záměru a projektů i v širších vztazích. Vzhledem k časovému odstupu od

zahájení těžby a vývoje na lokalitě se ukazuje nezbytnost monitoringu lokality a průběžné a zapracování nových zjištěných skutečností do sanačních a rekultivačních plánů.

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