

## Aquatic Ecology: Special issue ‘Ecology of a flooded opencast sulphur mine’

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Flooded opencast mines are ubiquitous. They are usually lignite pits, abandoned coal mines, quarries or clay-pits. Some flooded pits can be especially dangerous for the environment for instance after termination of uranium mining. Such problems are on record from the US, Germany (formerly East Germany), Czech Republic, Kazakhstan and some other countries. Reclamation of such pits is very expensive: the estimated costs may invariably be equal to the construction of a new mine. This explains why so many pits are abandoned. Despite this, some pits are reclaimed and rehabilitated by flooding and usually form new lakes. Such lakes are destined for water skiing, boating and other types of recreation. Such waterbodies, by-product of the mining industry, are excellent objects for scientific experiments and research studies. Most studies on these flooded pits concern hydrogeology, engineering management of lake escarpments, seepage from tailings, subsidence of ground, and other technical actions. Biological studies concentrated on reclamation of the surrounding dumping grounds. Series of biological

investigations, as in Germany on acid lignite pits, showed the usefulness of such environments in explaining ecological bases of the functioning of these extremely ill-defined ecosystems. In Poland there were two sulphur-strip mines: in Machów and Piaseczno near the town of Tarnobrzeg. The sulphur containing limestone at Machów mine was covered by 20 m of shale clay and after coating flooded in 2005. The mine at Piaseczno has remained for 35 years in a semi-flooded state. The age of the water (35 years), depth (about 22 m), meromixis and geology have attracted the attention of hydrobiologists. Simultaneous investigations on the whole food-web and the chemistry of the Piaseczno reservoir were carried out for 2 years and has yielded a series of scientific articles. Of these seven were accepted for publication in this special issue of the journal *Aquatic Ecology*. Some others have been published elsewhere. This special issue contains articles dealing with a range of study aspects varying from chemistry and sediments to primary producers, primary and secondary consumers and fishes at the top of the food pyramid. Several species new to Poland were found: blue-green alga, *Anabaena minderi* Huber-Pestalozzi; xanthophyte, *Vaucheria schleicheri* De Wildeman; diatoms, *Craticula buderii* (Hust.) Lange-Bertalot and *Brachysira microcephala* (Grun.), and chironomids, *Chironomus annularis* (Degeer) and *C. nudatarsis* Str. The old Thienemann's lake layers model was applied and a new notion is proposed for the layer in which the surplus of salts precipitates,

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namely the katalimnion. In the Piaseczno reservoir, the planktonic animals develop a complicated life strategy as an intermediate web between top-down and bottom-up interactions. Thus, they take in different positions in both the vertical profile in time and space.

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