



Historical floods versus contemporary land use in the Lomnica Valley, Sudetes, SW Poland - towards vulnerability assessment

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Catastrophic floods in the Bobr drainage basin (West Sudetes, SW Poland) occur every 15-20 years on average. Historical records of damage and losses caused by the floods, available from the 14C onwards, supplemented by field mapping, may assist in delimitation of channel and bank sections vulnerable to bed erosion, lateral erosion and excessive overbank deposition.

Lomnica River, a left tributary to the Bobr River, drains the northern slopes of the Karkonosze Mountains. Its hydrological regime is characterized by considerable changes in water level and high probability of exceeding the 'emergency state' level ($P = 93\%$ for the gauging station in the Lomnica village). The upper valley reach is V-shaped, the principal geomorphologically effective processes being bed erosion and undercutting of concave banks. At the mountain/piedmont junction widespread deposition took place, so that an extensive coalesced alluvial fan has developed. In this zone channel sinuosity increases and meander cut-offs and avulsions are favoured.

An extreme rainfall event in late August 1897 has caused a massive flood which was the last one to significantly re-shape the valley floor of Lomnica. In the next years (1910-12) an extensive channelization programme was implemented, involving lining channel banks with masonry, building of numerous low artificial mid-channel steps, and construction of four large dams. These were supplemented by a reservoir, and a dry reservoir in the piedmont zone was built in the following year. The main purpose of the system has been to suppress coarse bedload movement and to prevent the interference of flood waves from the Lomnica river and its tributaries. A general absence of significant re-modelling of the valley floor during the following floods (1926,

1938, 1958, 1977, 1996) confirmed the accuracy of hydrotechnical design. However, the sense of security has led to extensive building construction activity near the active channel, leaving only a short middle segment of the valley floor in agricultural use. Predicted increase in flood magnitudes and/or failures of dams may provide a significant threat and put the area at high risk.