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Can geosites be restored? The example of the Alto Vez geosite (Peneda Mountain, Portugal)

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One of the most important tasks in geoheritage management is the conservation of the geosite values, protecting them from natural or human induced degradation. In some cases, degradation still occurs even with the existence of geoconservation initiatives. Normally, the loss of geodiversity features is irreversible and protection measures are only applied in order to try to stop further damage. However, should this be imperative to all types of geosites? This question emerged with the case of the restoration of the Alto Vez geosite in the Peneda Mountain, one of the most remarkable fields of glacial erratic boulders in Portugal. Besides the erratic granite boulders, other relevant glacial features occur such as an U-shaped valley and moraines, justifying the inclusion of this site as one of the most important geosites in the Portuguese geoheritage inventory. Despite its scientific relevance, it is located just outside the contiguous Peneda-Gerês National Park, the most important protected area in Portugal. This national park was founded in 1971 and its limits were defined before the scientific discovery of these relevant glacial features. In 2012, a horseracing track was constructed in the geosite by the local village administration, with the removal of erratic boulders from their original place, affecting the natural landscape and the geosite's integrity. After a claim made by a citizen, legal and administrative actions made by the Portuguese Institute of Nature Conservation and Forests and by the municipal authorities, have resulted in the closure of the racing track, an assessment of the degradation and definition of a strategy to reduce the damages. Under our supervision, a restoration plan was conducted in 2017. Aerial photos captured by unmanned aerial vehicles were used, together with dGPS and GIS procedures. The initial topography was restored using earthmoving machinery and the buried erratic boulders were identified and carefully relocated to their original position. A management plan of the geosite is being produced in order to protect it more efficiently through a statutory designation and to promote its tourism and educational uses. This case-study shows that a well-informed society is essential to help authorities to protect geoheritage and that a geosite restoration is possible when the main geodiversity features are not yet fully destroyed.